

December 27, 1956

# The IRON AGE



**Steel: Are Reds Gaining On Free World? P.23**

**How To Simplify Engineering Drawings P.53**

**What Foremen Want: Word From The Top P.26**  
**Digest of the Week P-2**

"Trade Names You Can Trust!"

No matter when or where they are purchased, any length of genuine Hoskins Chromel-P wire can be used with any length of genuine Alumel wire to form a thermocouple which will operate within the close limits specified by Hoskins' Accuracy Guarantee:  $\pm 4^{\circ}\text{F}$ . from  $32^{\circ}$  to  $530^{\circ}\text{F}$ ., and  $\pm \frac{3}{4}\%$  from  $531^{\circ}$  to  $2300^{\circ}\text{F}$ .



**HOSKINS**

# Chromel-Alumel

**THERMOCOUPLE ALLOYS**

**CONSIDER** for a moment the significance of the statement made above and what it means to users of Hoskins Chromel-Alumel thermocouple alloys the world over. For example, take "The Case of the Ageless Alumel" . . .

Not long ago, an industrial concern in Japan "discovered" 265 pounds of 8-gauge wire hidden away in a remote corner of their plant. Its Inspection Tag, still intact, identified it as being Hoskins Alumel that had been purchased over 20 years ago. How it had escaped being used during all those years no one knew. Inasmuch as it was still in good usable condition, however, the company wrote to inquire if it would be practical . . . or indeed even possible to have a similar quantity of 8-gauge Chromel-P wire specially processed so that its millivoltage would match that of the 1933-vintage Alumel. Imagine their surprise when they were advised that all Chromel-P alloy is specially processed by Hoskins to a uniform standard of quality, and that . . . "regardless of when produced or where purchased, any length of genuine Chromel-P wire can be joined to any length of

genuine Alumel to form a thermocouple which will register true temperature-emf values within the close specified limits of Hoskins Accuracy Guarantee."

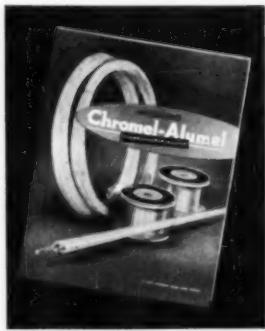
No wonder, then, that Chromel-Alumel thermocouples are the world's basic standard of accuracy for the measurement of high temperatures. No wonder that the words "Chromel-Alumel" are recognized as . . . "trade names you can trust!"

**If you use thermocouples**, this new manual is meant for you! It contains complete specifications on Chromel-Alumel alloys, lists temperature-millivolt equivalents, explains standardization procedures, gives much useful application data. And it's yours for the asking without obligation. Send for your free copy today!

*Chromel-Alumel thermocouple alloys are produced exclusively by*

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## WELDING PLATE GIRDER FOR CONNECTICUT HIGHWAY BRIDGE

This 120-ft-long welded plate girder is one of eight fabricated at the New Market, N. J., shop of Harris Structural Steel Company for an expressway bridge in Connecticut. Made entirely from Bethlehem plates, each of the girders weighs 22 tons, has a web 120 ft long and  $\frac{1}{2}$  in. thick, while the top and the bottom chords vary in thickness from  $\frac{3}{8}$  in. to  $1\frac{3}{4}$  in. The uniform quality of Bethlehem

plates makes them ideally suited for fabricating weldments; the use of these plates, plus proper welding technique, gives assurance of sound welds. Bethlehem plates come in a full range of sheared and universal mill sizes.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

**BETHLEHEM STEEL**



Dec. 27, 1956—Vol. 178, No. 26

## The IRON AGE

## Digest of the Week in Metalworking

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Chestnut and 56th Sts. Philadelphia 39, Pa.

## NEWS DEVELOPMENTS

## BIG RUSH TO SHIPYARDS

FOR TANKERS P. 25

There are 102 tankers now on order. This will mean even tighter steel markets for plates and structurals. Push for tankers was under way even before Suez. Tanker fleet was obsolete, economies dictated larger tankers.

## FOREMEN: DON'T KEEP THEM

IN THE DARK P. 26

Over half of the delegates to a recent National Management Assn. convention were first level foremen. Rate more and quicker information from top management most important, report opinions on other important management matters.

## THE LABORATORY:

WHERE PROFITS BEGIN P. 27

Each year that goes by finds industry spending more on research and de-



velopment programs. Even small companies are finding it to their advantage to invest in this area.

## WHAT DOES LABOR HAVE

UP ITS SLEEVE? P. 33

1957 won't be a critical year for labor relations. But it will be one of planning and charting long term goals. Labor won't be content to rest on its laurels from recent hard-won long-term contracts.



Free World steel production is still outpacing Russia and Red orbit countries by 3-to-1, says Special Report on P. 23. The Reds gained slightly in '56, due largely to the U. S. steel strike. Steel capacity is expanding worldwide.

## LABOR AIMS AT WHITE COLLAR WORKERS P. 41

Next year will see big drive to organize office workers. Reuther admits difficulty, plans new organizing techniques. In the past, unions have met with spotty success in trying to sign up white-collar workers. The group as a whole enjoys the reflected prestige that comes from associating with top management and reflects its unionism views.

## FEATURE ARTICLES

### IT'S CHEAPER TO MAKE SIMPLER DRAWINGS P. 53

Only recently have engineering drawings taken on a new look—a more practical one. No matter how well done a drawing might be, it fails unless it's simple, concise and instructive. You'll save time and money if you take out complexity where it's not needed, and standardize engineering forms.

### FLASH WELD TITANIUM TO HIGH STRENGTH P. 57

Flash welding offers an outstanding joining method for the production line fabricating of structures from the higher strength titanium alloys. Certain alpha-beta titanium alloys can be solution heat treated and aged after flash welding to tensile strengths of 175,000 psi.

### DRAW BENDING KEEPS OUTPUT UP, COSTS DOWN P. 58

In bending tubing, extrusions, angular sections, bar stock and allied work-pieces, automatic draw bending can keep production up and costs down. Bends are smooth and without distortion. Regardless of the number of bends per part, it's possible to make 700 or more bends per hr. on automatic equipment.

### ALUMINIZED STEEL STANDS OFF ATMOSPHERIC CORROSION P. 60

Recent entry in the aluminum-coated sheet-steels area, Armco Aluminized Steel Type 2, offers a steel well suited to fighting off corrosion. Here's a report on its properties, comparative costs, and fabricating characteristics. It stands up remarkably well in industrial atmospheres. Added assets to the product are good fabrication and attractive cost.

### HAND ROLLING, GOOD SCHEDULING BOOST MILL'S EFFICIENCY P. 63

Producing short-run stainless items on a bar mill calls for frequent roll changes. At the same time, costs must be kept low. Therefore, there's a premium on careful planning when a new mill is designed. However, here's one installation which yields top efficiency through a combination of hand-operated and continuous equipment.

## MARKETS AND PRICES

### CONSTRUCTION BOOM AIDS PLUMBING FIXTURE FIRMS P. 30

Decline in homebuilding is offset for fixture producers by trend toward 1½ and 2 baths per home. Counter type kitchen layouts boost steel sink sales. Vitreous china industry is a formidable competitor. Sales of metal fixtures in '54 came to \$208 million. In the same year sales of fittings were \$215 million.

## NEXT WEEK:

### THE 1957 MARKET FORECAST

A full-scale forecast on all of the leading metals markets will appear in the IRON AGE Annual. Additional features will cover America's No. 1 customer and information source—the U. S. Government—and describe the effects of population growth on expansion and plant location.

### WHY CHEVROLET'S DEPTH IS HARD TO BEAT P. 36

The No. 1 producer's new engineering center is the last word. Wealth of Chevrolet points up the problem of the independents today. It takes depth of resources to compete in the Big Three. Even though a company may have top grade personnel, it must have money behind it.

### SAN FRANCISCO VOWS FEWER PRODUCT IMPORTS P. 43

Area moves to slash reliance on out-of-state suppliers. Local firms are asked what products they import which could be made locally. San Francisco Chamber of Commerce is the group spearheading this drive. The first step was a survey of local industries.

### AIRCRAFT INDUSTRY BREWING A REVOLUTION P. 45

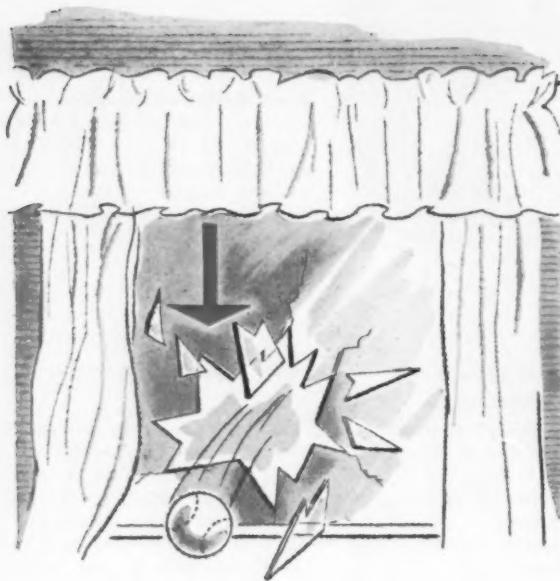
Need for higher speeds means new metals. Heat-resistant titanium and steel alloys do the job, but are harder to machine. Industry is seeking machine tools based on new concepts.

### A GLOOMY OUTLOOK FOR STEEL PLATE USERS P. 81

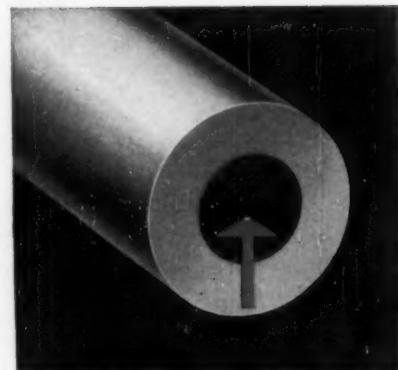
The handwriting is on the wall for steel plate users. The pressure for a speedup of oil tanker construction will siphon more plate from an already tight market. A system of "voluntary" controls will do the job.

### MARKETS FOR METALWORKING

Informative articles will report on more than thirty metalworking industries—the leading markets for many metal products. The annual also contains major stories on aluminum, copper, and steel, plus the yearly 16-page production and price data section.



a hole here means work...



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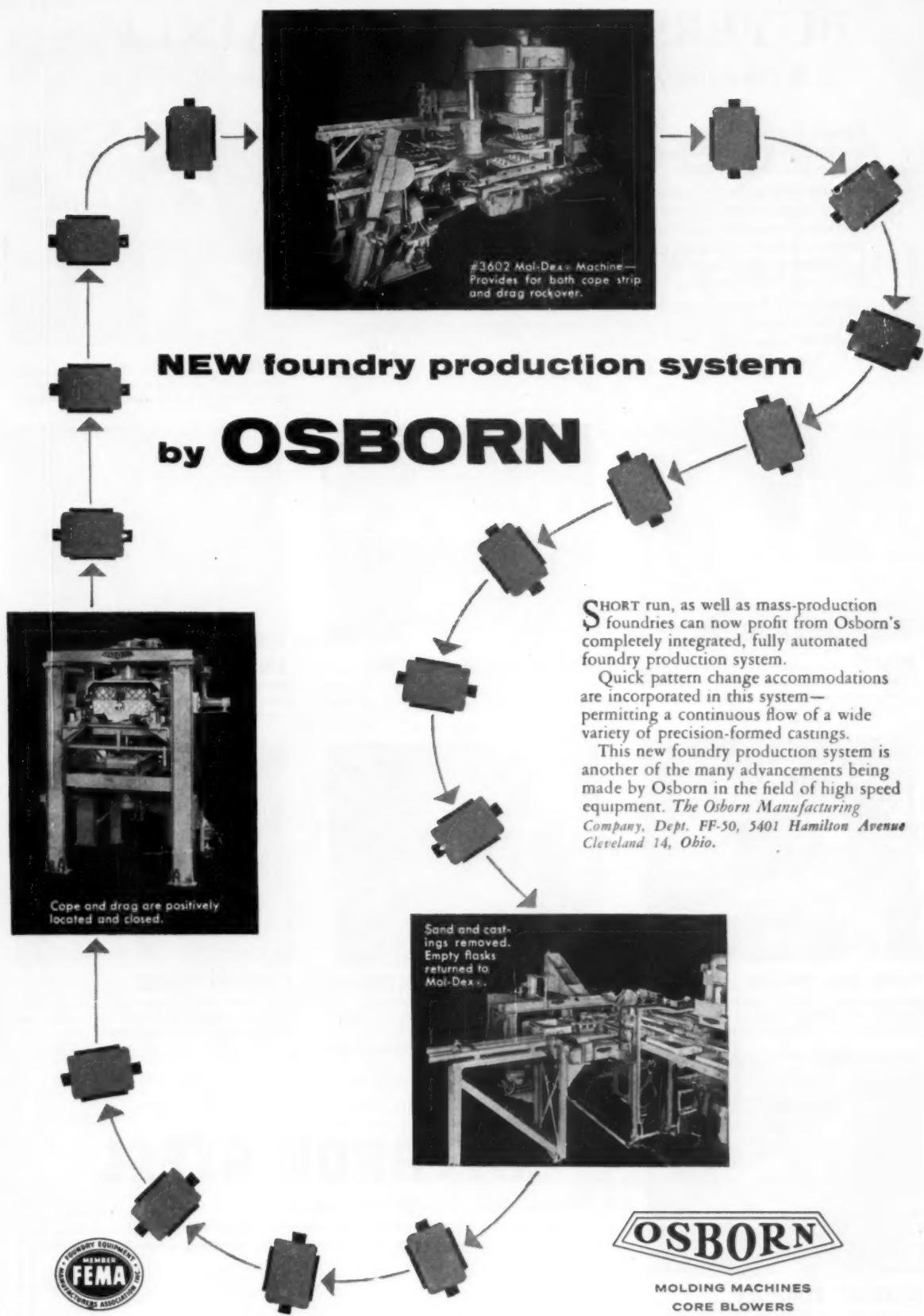
You can now get Crucible Hollow Tool Steel Bars in any of the famous Crucible tool steel grades, in virtually any I.D. and O.D. combination. And you can get *immediate delivery* from stock of the five most useful grades — KETOS oil-hardenning . . . SANDERSON water-hardenning . . . AIRDI 150 high-carbon, high-chromium . . . AIRKOOL air-hardenning . . . NU DIE V hot-work tool steels.

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# BUYERS GUIDE TO STAINLESS

## A Directory of Ryerson Stainless Steels and Services

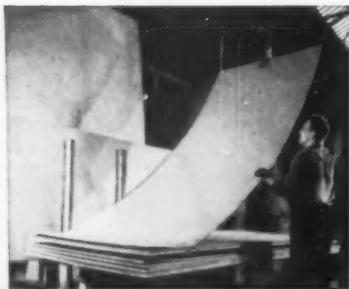
Here's a quick guide to the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of Allegheny stainless in stock at Ryerson.

This wide selection assures you of getting the best stainless for every application. Extra care in storage, handling and shipping—such as padded shear clamps to protect finish and flatness of sheets—guards the high quality of Ryerson stainless stocks. And in addition, the help of full-time stainless specialists is yours when you call Ryerson.

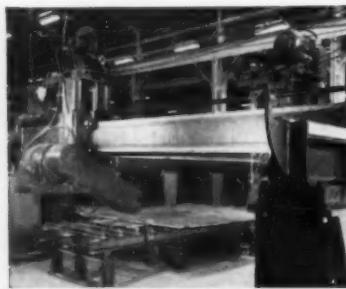
See your Ryerson catalog for a complete listing of stocks and call your nearby Ryerson plant for quick shipment of Allegheny stainless—one piece or a truckload.



**SHEETS**—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs.



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Indexed in the Industrial Arts Index  
and the Engineering Index.



# EDITORIAL

## What About 1957's Last Half?

♦ THE NEWS is all in; the experts have spoken. The first six months of next year are to be good. The remaining part of the year is to show a decline. That's the way the composite view of various business forecasters stacks up.

Let's take a look at this reasonable facsimile of the 1957 crystal-ball-gazer's reading. Isn't it a familiar story? Don't we always—at this time—say that the last six months won't be so good? This is called intellectual hedging.

Summer falls in the last six months. The trend is for everyone and his brother to take off for parts unknown in July or August. So much so that many plants have been forced to shut down because there wasn't anyone to do business with.

It is true that there is always a chance that the second half will spark a downward trend. That is what a lot of people think will happen in 1957. Even if that occurs it doesn't answer the next most important question. How bad will it be?

We believe that last six months of next year will be close to the first half in production, finances and profits. There is just as much reason to expect such a condition in metalworking as there is to look for a decline.

The real answers may be found in intangibles. But there are enough straws in the wind to feel that the experts who look for the beginning of a downward trend in business by the last half of 1957 may be quite wrong. They have bet on the wrong horse before.

Defense outlays will be up sharply next year. Missiles, aircraft and a "hold the line" policy on armed forces mean more spending. We don't like it any more than you do but we are dealing with facts, not philosophy.

The Middle East outlook spells more oil, steel, ships and exports for us. And it means we will foot a big part of the bill. It may take all of 1957 to straighten out this mess.

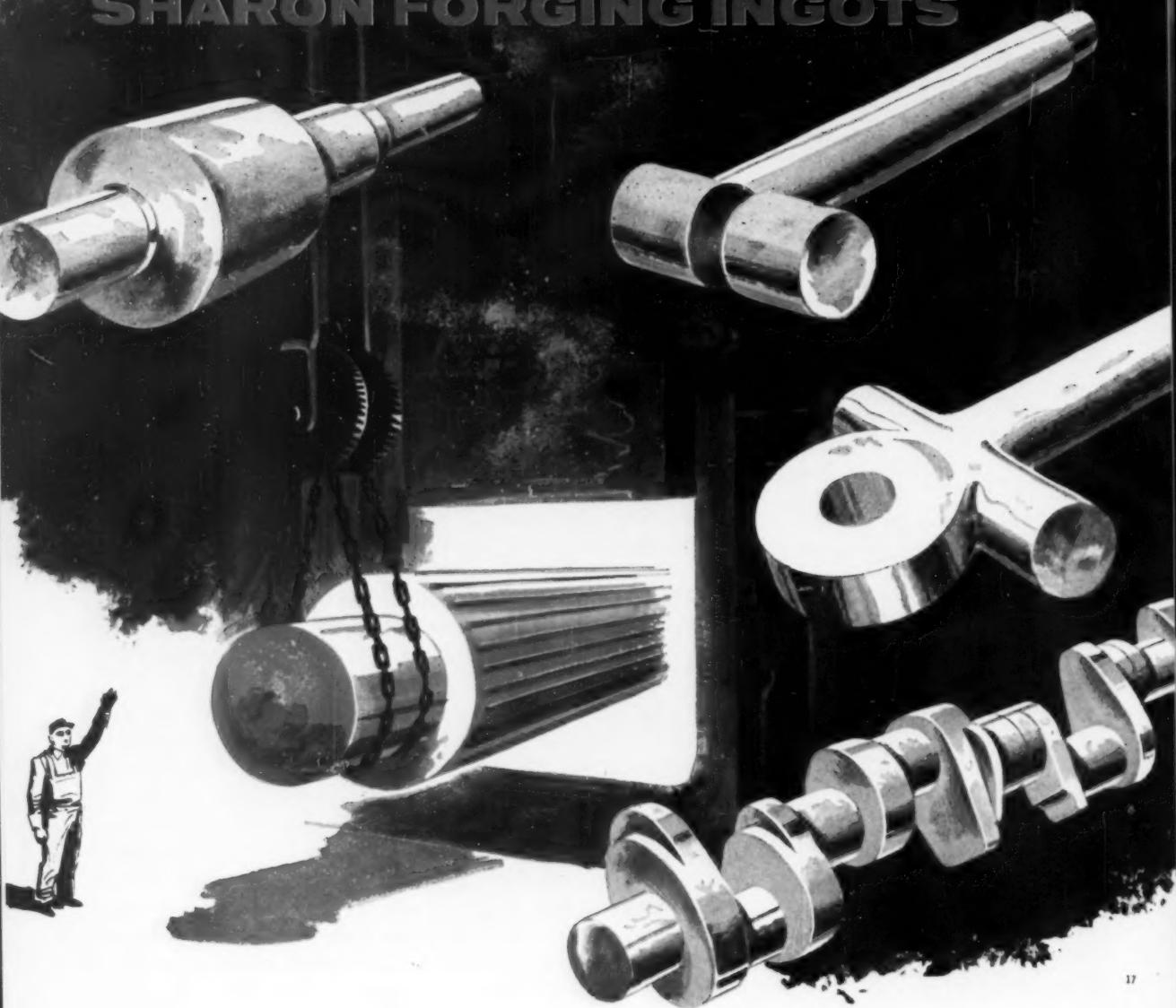
School and church building is far behind schedule. Office buildings, and highway and plant equipment expenditures are going to show an increase in volume next year.

More important—the country is growing. We are betting 1957 will be more active than 1956 was. And out goes our neck to say "the last half will be good in any language."

*Tom Campbell*

EDITOR-IN-CHIEF

# SHARON FORGING INGOTS



17

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Sharon Open Hearth Quality Forging Ingots — now available in Carbon and Alloy grades, with ingot weights up to 109,000 pounds. Sharon Electric Furnace Quality Ingots — Stainless and Alloy grades, up to 50,000 pounds. • Sharon is

also a prime supplier of billets, blooms and slabs — to customer specifications — in Stainless and Alloy grades. For prices — contact the Sharon Steel Corporation, Forging and Semi-Finished Steel Sales Department — or one of the district sales offices listed below.

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dear editor:

letters from readers

### Stone Thrower?

Sir:

Re your editorial of the Nov. 8th 1956 criticizing British and French action in the Middle East. What about the American interference in Guatemala at the time of the threatened Communist insurrection? This I believe was also in connection with the protection of a certain canal. Those who live in glass houses shouldn't throw stones. *R. H. A. Crawley, Leicester, England.*

You must be thinking of the revolution in Panama when President Theodore Roosevelt landed Marines following reports that a dog had been killed in a "bloody revolution." We submit that the difference in Guatemala is that U. S. troops were not landed. In short, war was not used as an instrument of national policy.—Ed.

### Pitfalls

Sir:

We would appreciate your sending us a copy of Mr. Richard W. Dalzell's article "Diversification—Watch the Pitfalls," which appeared in the Aug. 16, 1956 issue of your magazine.

This article is most interesting and we would like to have a reprint for future reference. *N. B. Jagemann, Director, New Product Ventures, Aluminum Goods Mfg. Co., Manitowoc, Wis.*

### Special Interest

Sir:

Your Aug. 30 article entitled, "Ultrasonics: Sound Breaks Metalworking Barriers" proved to be of special interest to us, and we will appreciate your sending us a reprint of the July 26th item for our reference files. *H. A. Doty, Chemical Engineer, General Electric Co., Allentown, Pa.*

### Just In Time

Sir:

Just read the Sept. 27 article "How to Get More for Your Inspection Dollar." It was very informative and timely, as we are now engaged in an extensive quality control program. Would appreciate several copies for my use, and for distribution to other inspection foremen. *C. Konbenec, Inspection Foreman, G.E. X-Ray Co., Milwaukee, Wis.*

Copies are on the way.—Ed.

### Industrial Health

Sir:

Please send us six reprints of the article, "Ten Commandments of Industrial Health," which appeared in a recent issue.

We think this article is so well written and the subject so important that every department head of our firm should have a copy permanently on hand. *T. C. Hoffmann, Vice Pres., Staley Elevator Co., Inc., Long Island City, N. Y.*



"For the last time, Benson, get that new part in here!"

OH WHAT HEADACHES!



### WISH I HAD ORDERED FROM GARRETT

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You get what you order when you order it . . . from Garrett. No waiting for late shipments. You can't beat Garrett service. No worries about Garrett . . . quality. Every Garrett washer, hose clamp, stamping or assembly is right up to the peak of quality. High quality is assured by Garrett's "statistical quality control" system.

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## fatigue cracks

### You Arbitrate It

You may recall last week's cover story, "Arbitrators: Blessed or Damned?" Working on that story, one of our editors stopped in at the offices of the American Arbitration Assn. in New York.

We gave you a rundown on this fine group last week. What we didn't tell you was that his talks with officials there, including executive-vp J. Noble Braden, turned up another idea. He looked at dozens of typical arbitration case histories, sat in on some arbitration sessions.

The result is a new series which we'll offer **THE IRON AGE** readers in the second issue of each month. You'll find it just after the technical section, illustrated with a specially drawn cartoon.

Read about the Plastered Painter, Josie the Class A Assembler and other characters who stalk the arbitrators' dreams; people who were fired or wanted the foreman fired or just more money. Pit your wits against the arbitrators. No looking around for the answers, no waiting; answers to each month's case will appear right on the same page. "You Arbitrate It," we'll call it; and we hope you will.

### How's The Market?

If you're like most of us, you've got a certain amount of "too close to the woods to see the trees" in you. But did it ever strike you that the sales of metalworking companies have more than doubled in the past ten years?

Well, fortunately it struck our editors some months back that here was a big story, well worth talking about. So—next week the theme of our Annual Issue will be "Metalworking's Growing Markets."

Here are some of the features you can look forward to: Long

term forecast for the three principal metals, aluminum, copper and steel; Population trends and what they mean to metalworking; Market outlook for more than a score of metalworking industries with 1947-1954 census data coupled with 1956 performance and trends worth watching.

You'll also find special reports on the automotive industry and the West Coast market; machine tool outlook; and from Washington—the chance of tax cuts, effect of social security changes and the climates for business in '57.

It's a big one. Look for it next week.

### Puzzlers

We're a long time delivering the answer, but finally we figured that Mr. A is 55 years old, and Mr. B is a ripe 33 (Nov. 1 puzzler). Winners: William C. Mueller, Western Electric; W. C. Cook, W. C. Nabors Co., Mansfield, La.; E. E. Crowel, Jr., Day & Zimmermann, Inc., Texarkana, Texas; Nels Johnson, Wireeryte, Inc., Cicero, Ill.; and C. P. del Cano, F. Hardie and D. F. Bachman of IBM Corp.



"Fellows, this is a team job! Look these prints over very carefully—Give me your best ideas—Then I'll tell you how we're gonna do it!"

## Alloy Strip in Precision Sizes meets New Design Needs...



From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

**Beryllium Copper**  
**Phosphor Bronze**  
**Nickel Silver**  
**Brass**  
**Chromium Copper**  
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dates to remember

## JANUARY

**American Electropainters Society**—Winter meeting, Jan. 12, Sheraton Penn Hotel, Pittsburgh. Society headquarters, 445 Broad St., Newark 2, N. J.

**Institute of Scrap Iron & Steel, Inc.**—Annual convention, Jan. 13-16, Eden Roc and Fontainebleau Hotels, Miami Beach, Fla. Society headquarters, 1729 H St., N.W., Washington, D. C.

**Society of Automotive Engineers, Inc.**—Annual meeting, Jan. 14-18, The Sheraton-Cadillac and Statler Hotels, Detroit. Society headquarters, 29 W. 39th St., New York.

## EXPOSITIONS

**American Society for Metals**—March 25-29, Los Angeles.

**American Foundrymen's Society**—May 6-10, Cincinnati.

**The Society of Plastics Engineers, Inc.**—Annual national technical conference, Jan. 16-18, Hotel Sheraton-Jefferson, St. Louis, Mo. Society headquarters, 34 E. Putnam Ave., Greenwich, Conn.

**Steel Plate Fabricators Assn.**—Annual meeting, Jan. 17-18, Palmer House Hotel, Chicago. Assn. headquarters, 79 W. Monroe St., Chicago.

**Malleable Founders' Society**—Semi-annual meeting, Jan. 18, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

**Compressed Gas Assn., Inc.**—Annual meeting, Jan. 21-23, Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

**American Standards Assn.**—Gaillard seminar on industrial standardization, Jan. 21-25, Engineering Societies Bldg., New York. Society headquarters, 70 E. 45th St., New York.

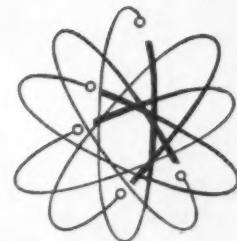
**American Boiler Manufacturers Assn. & Affiliated Industries**—Mid-winter meeting, Jan. 22, Hotel Statler, Cleveland. Assn. headquarters, 1571 W. 117th St., Cleveland.

**Industrial Heating Equipment Assn., Inc.**—Annual meeting, Jan. 28-29, The Shoreham Hotel, Washington. Assn. headquarters, 1145 19th St., N.W., Washington, D. C.

**Cutting Tool Mfrs. Assn.**—Annual meeting, Jan. 29, Detroit Yacht Club, Detroit. Assn. headquarters, 416 Penobscot Bldg., Detroit.

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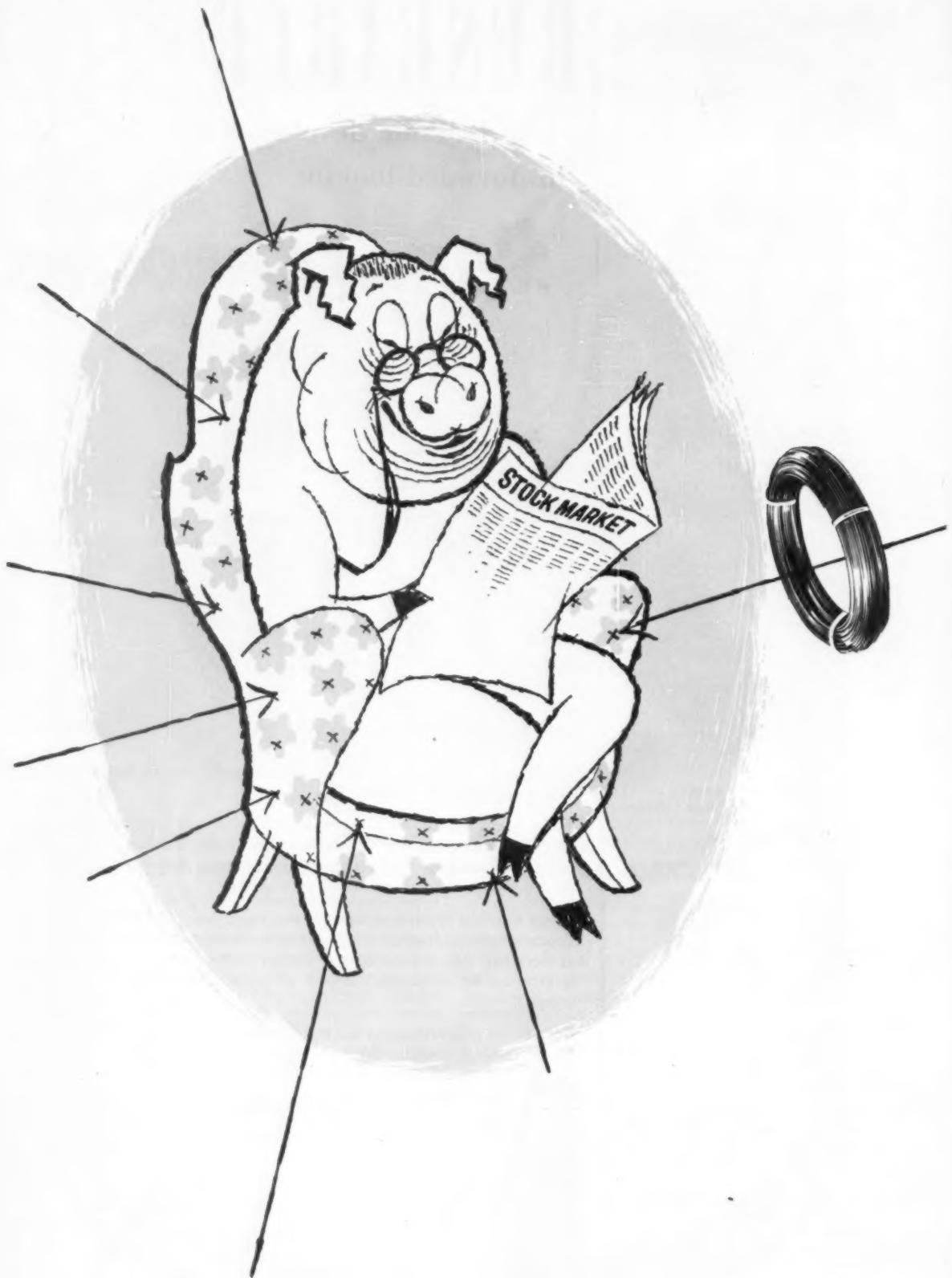
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**NORTH CAROLINA**  
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# hog rings that never see a hog

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Chances are you don't need wire to make hog rings. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous*. Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

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Mattress Wire  
Picture Cord Wire  
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Pin Ticket Wire  
Pin Wire  
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Hose Reinforcement Wire  
Hose Wire, Mechanical  
Hose Wire, Vacuum and Defroster  
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Wire  
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Clothes Pin Wire  
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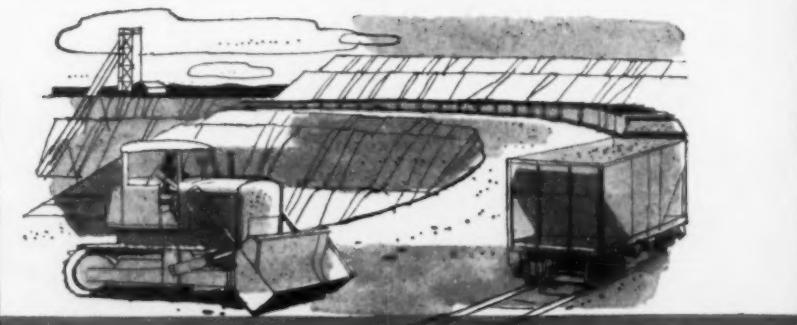
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# From Mine to Mill

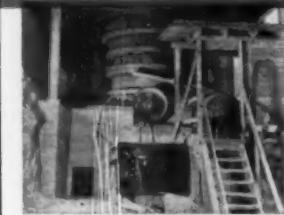
**Allis-Chalmers Equipment  
serves in every part of  
the Steel Industry...  
Dependably, Economically**

For more than three quarters of a century, Allis-Chalmers has served the steel industry — supplying the equipment needed to produce top quality steel . . . the manufacturing "know-how" to meet heavy-duty operating conditions . . . the pioneering spirit to keep up with the changing requirements of the industry. Allis-Chalmers machines are employed, not just in one phase, but all through the steel-making process. For complete information on how Allis-Chalmers can help solve your machinery problems, consult your Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.

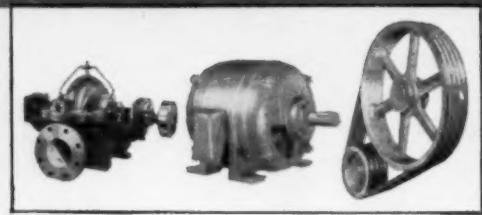
Regulex and Texrope are Allis-Chalmers trademarks.



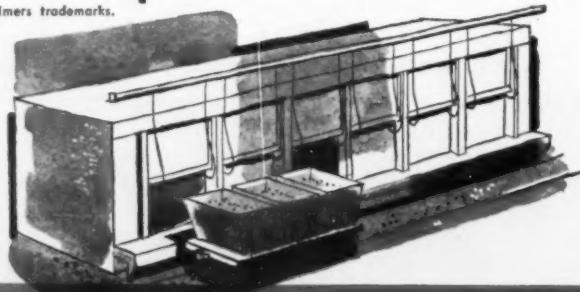
**MINES . . .**



**Crushers, grinding mills, vibrating screens engineered and manufactured by Allis-Chalmers** crush the ore-bearing rock, grind it to specified size, size and wash metallic ores, stone and coal.

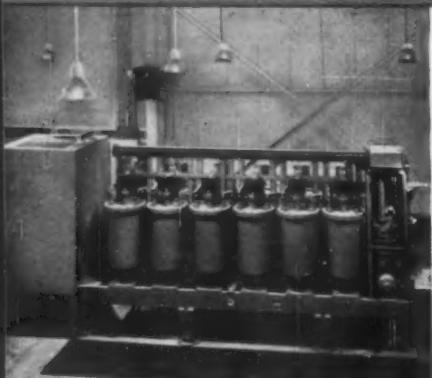


**Allis-Chalmers pumps, motors, Texrope drives** are in wide use throughout the metal industry because of their long life characteristics, low maintenance requirements and great versatility.

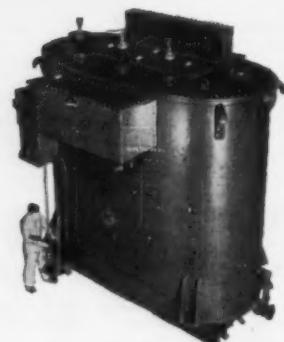


**OPEN HEARTH . . .**

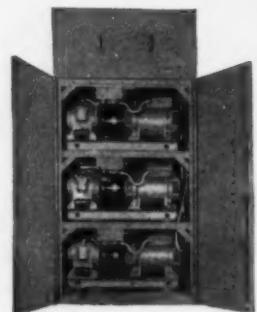
**ELECTRIC FURNACE . . .**



**Mercury-arc rectifiers** furnish constant voltage dc power for material handling in open hearth and other mill operations and for mine haulage. Variable voltage units are supplied for supporting main roll drives.



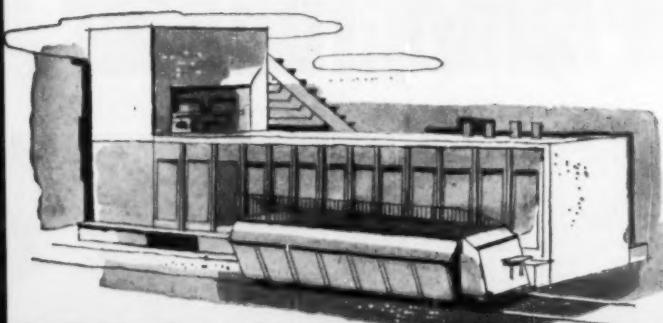
**Allis-Chalmers arc furnace transformers** are of well-balanced design and extra heavy duty construction — proven in 25-30 years of repeated daily short-circuits in electric furnace operation.



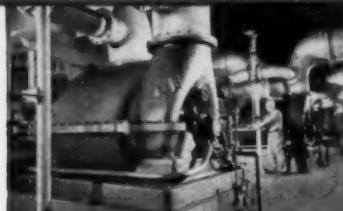
**Regulex control** balances arc current with arc voltage, almost instantly — maintains desired arc condition automatically.

# ALLIS-

# It's Allis-Chalmers

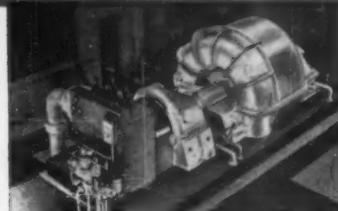


COKE OVEN...

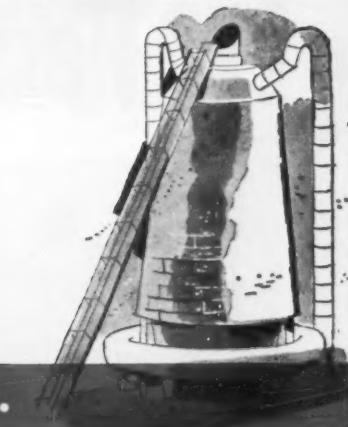


Booster, exhauster or combination service requirements are met by Allis-Chalmers blowers. Photo shows four 23,000-cfm, 5100-rpm, 3.5-psig centrifugal exhaust blowers in a western steel mill.

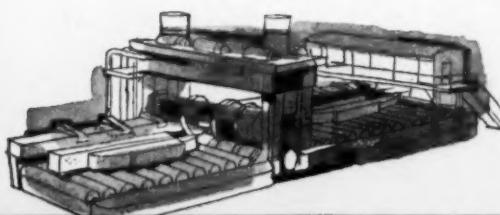
BLAST FURNACE...



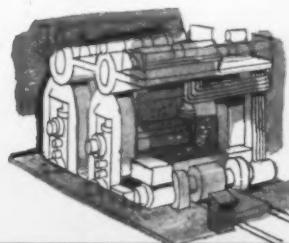
Blast furnace blowers furnished by Allis-Chalmers meet blast furnace requirements. The 75,000-cfm, 30-psig centrifugal blower shown here has been in service since 1942. It is driven by an 8500-hp steam turbine.



Allis-Chalmers axial blowers are designed for high efficiency blast furnace duty. They are smaller, easier to install — save \$50,000 or more in steam per year. A-C also builds constant efficiency rotary compressors.



BLOOMING MILL...



FINISHING MILLS...



Motor room photograph shows Allis-Chalmers switchgear, control, constant and variable voltage motor-generator sets, Regulux m-g sets, liquid rheostat, and twin-drive motors in use in a midwestern steel plant.



Hot strip, cold reduction, temper, rod and wire mills, and annealing and pickling lines employ Allis-Chalmers control, power equipment and drive motors for dependable operation.

## Other Equipment

Besides the power utilization and conversion equipment illustrated, Allis-Chalmers also supplies power generation and distribution requirements from mine to mill.

For power generation, A-C builds steam turbine-generator units, surface condensers, water conditioning equipment, pumps, motors, and control. Also hydraulic turbines, generators, governors, and valves. For power distribution, A-C furnishes transformers, voltage regulators, circuit breakers, switchgear, and substations.

Throughout this wide range of products, you can depend on Allis-Chalmers for equipment engineered to meet your exact needs.

# CHALMERS



A-4907

**WHEN IT'S MOVING...MAKE IT TUBING**

# Pound for Pound, Tubular



Wheeled chairs get stiff workouts in fast-moving paraplegic basketball. Tubular construction keeps them strong, safe, maneuverable. When it's moving, make it steel tubing.

# REPUBLIC



*World's Widest Range of Standard Steels*

# Construction is STRONGEST!

At any given weight, tubing is strongest of all mechanical shapes . . . stronger under compressive load . . . stronger as a beam . . . stronger in torsion.

And, dollar for dollar Republic ELECTRUNITE Steel Mechanical Tubing is your best buy. ELECTRUNITE is the original electric resistance welded tube. It's the quality tube of industry, available in a wide variety of forms, sizes and gages . . . in both carbon and stainless steel.

For volume production, ELECTRUNITE tubing is consistently uniform, foot to

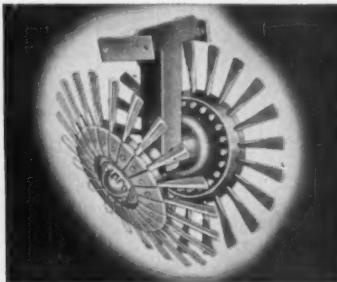
foot, shipment to shipment. It offers uniform wall thickness and concentricity. Surfaces are free from scratches and pit marks. It offers uniform response to heat treatment. It is easy to fabricate . . . often eliminates some costly fabricating or machining operations.

When your product must be strong, safe, lightweight, investigate Republic ELECTRUNITE Steel Tubing. Republic engineers can help you design it into your products and processes, economically and profitably. Send coupon for facts.

## MORE REPUBLIC PRODUCTS MADE FOR MOVEMENT:



"I PUT REPUBLIC NYLOK NUTS TO THE TEST every time I ride my Taylor Tot," reports this young test driver. In spite of all the bumps, bounces and jolts, Nylok Nuts always hold tight. The reason: a special Nylon plug that assures positive locking in any position wherever you stop wrenching. Send coupon for details.



THESE BEET DIGGER TIRES ARE 24% STRONGER since John Deere switched to alloy steel. Originally fabricated from carbon steel, they would sometimes break under stress. By taking advantage of alloy's hardenability—plus superior strength—bending and abrasion problems have been eliminated. Send coupon for complete data on Republic Alloy Steels.



DOUGLAS AIRCRAFT ADDED A PASSENGER—AT NO INCREASE IN WEIGHT on their new DC-7 superliner. How? By substituting Titanium for other metals normally used in nacelle construction. Republic is an old hand at this high strength-to-weight business. Send coupon for information on how Republic Titanium and Titanium Alloys may help your product.

# STEEL

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\*U.S. Pat. No. 2,450,694 and pending applications.

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#### WHY THE FEED BAG BECAME A FLOWER POT

Remember horses? They were strong, kindly four-legged animals and they used to be essential in our lives, particularly on the farm. Then, in just a few short years, the farm equipment industry changed everything. Today's mechanized farmer produces more with less work, and enjoys more of the good things of life. Improvements in farm equipment have often gone hand-in-hand with progress in steelmaking. And, at Inland, we've been working for many years at the job of producing the *right* steels for better farming.

**INLAND STEEL COMPANY** 38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the farm equipment industry include hot and cold rolled sheets and strip, Ti-Co galvanized sheets, bars. Other products: plates, structural, 4-Way safety plate, tin mill products, reinforcing bars, rails and track accessories, coal chemicals.



## NEWSFRONT

**Pressure's Heavy For More Pig**

Peak prices now being paid for scrap turnings for blast-furnace use point up the pressure for more pig iron. One steelman says prices are at a point where it's not economical to use turnings in iron making. However, blast furnace output goes up .6 ton for every ton of turnings added. Mills need all the iron they can get and are paying up to \$49 for turnings.

**Aluminum: Will Prices Hold?**

Aluminum producers hope to be able to resist pressure for a price increase. They're pressured from two directions—the cost of living wage increase of 3¢ to 4¢ due January 1 and the recent 7 pct hike in railroad freight rates. But with fourth-quarter shipments lagging and production capacity expanding they're hesitant to increase prices now.

**Auto Division May Make Own Body**

Rumors persist in the auto industry that Pontiac Motor Div., due for a major change in 1958, will have a separate body shell. In the past it has shared GM's "A" body with Chevrolet. Reason for the change would be an effort to boost Pontiac's share of the medium-price automotive market.

**Can Graphitization be Predicted?**

Is it possible to predict effects of alloying elements on the rate of graphitization in white cast iron? A recent research program—checking effects of Al, Si, Ni, Cu, Co, V, Cr—found graphitization rates vary markedly. In general, rates were slow when the binding energy between iron and the alloying elements were large and when difference in atomic diameters between the two was small.

**One Reason for Merging**

One reason behind the move by Jones & Laughlin to acquire Rotary Electric Steel Co. goes behind J&L's entry into the stainless steel field. Acquiring the Detroit electric steel firm will—at one stride—establish J&L as a producer in the heart of the automotive industry. This will

probably be J&L's biggest stainless market.

**Farm Equipment Outlook Improves**

An increasing number of farm equipment manufacturers are revising their 1957 production estimates upward. They're counting on at least a 5 pct gain in dollar volume due to higher selling prices alone. But beyond this, estimates are being pushed upward to meet increasingly optimistic forecasts from field salesmen.

**Uranium Ore: How North America Stands**

America's uranium producers can draw on 60 million tons of domestic ore reserves (two-thirds of them in New Mexico). Canadian sources cite known reserves nearly four times as great. U. S. production of uranium concentrates is now 8000 tons a year, AEC reports—about double the production of a year ago.

**Trickier, One-Piece Diecastings**

A process for diecasting parts with working joints in one piece is stirring interest. Examples are a one-piece binder ring that separates at a diecast joint, and a continuously diecast loose-link chain. Patented process calls for diecasting parts in the one die, but with two or more steps involved. Contraction on cooling permits the working joint.

**Aluminum Eyes Container-Cap Market**

Look for aluminum producers to up their activity in the container cap field. They now have such caps in development or in limited-use for both cosmetic and beverage containers; are looking on caps for baby food containers with particular interest. Aluminum caps permit striking decorative effects. But there are still some cost problems to overcome.

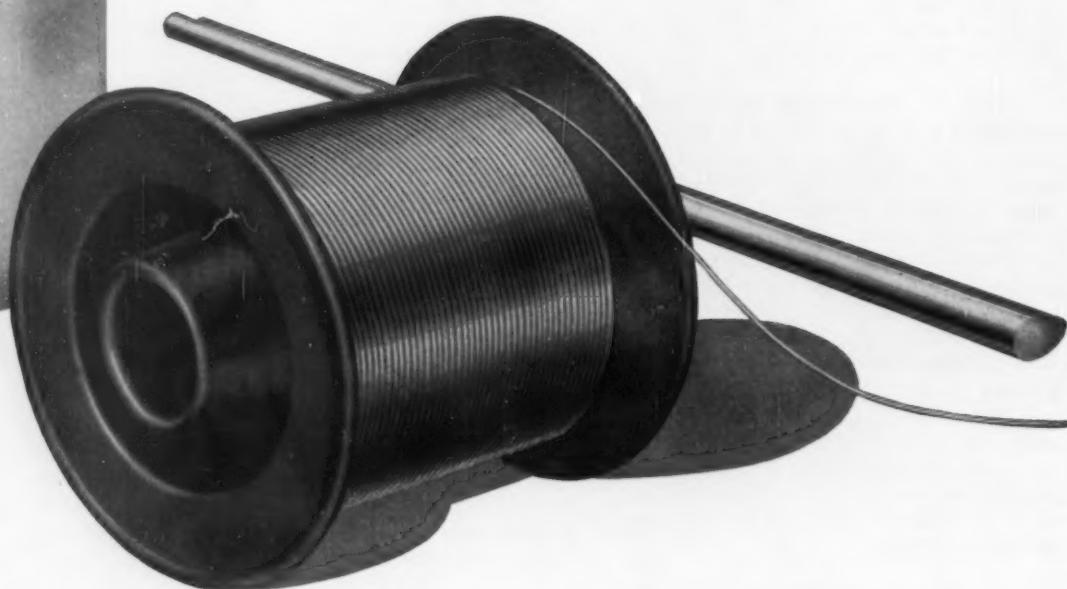
**Stainless Producers Sweating It Out**

Stainless steel producers will be sweating out nickel allotments in early '57. Even with the stockpile diversion program fully clarified, nickel requirements of the military make industrial allotments uncertain. New stainless facilities going into operation in first quarter will require even more nickel.

# GRANODRAW SS®

## -unique oxalate coating process

facilitates cold forming of  
stainless steel, eliminates leading  
and de-leading operations



The absorbent crystalline coating produced by this ACP process is chemically bonded to the pickled and activated metal surface and acts as a carrier for suitable lubricants. The combination of the Granodraw SS coating and lubricant greatly improves production and product quality in such cold forming operations as drawing of wire, bars and tubing; cold shaping; deep

drawing; cold heading; ironing; necking; extruding; and upsetting. Among the other advantages of the Granodraw SS coating is the elimination of leading and de-leading operations; the storing of coated products indefinitely without breakdown of the coating or pitting of the base metal; and the short coating cycle. For complete information about Granodraw SS, write ACP today.

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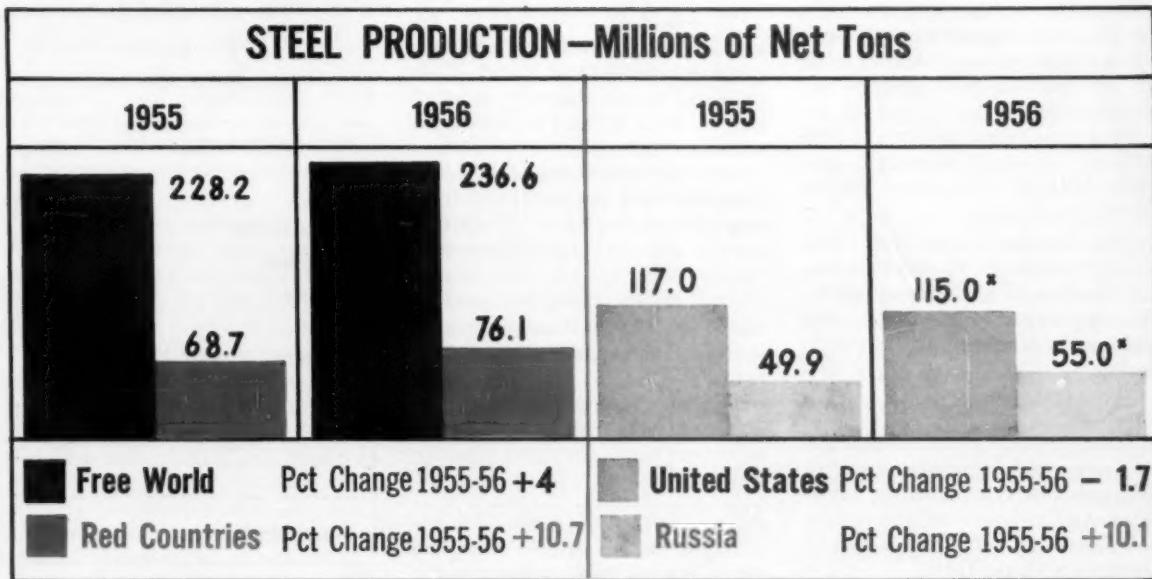
WINDSOR, ONTARIO





NEWS SECTION

## Free World Versus Reds



\* 1956—Estimate

## Free World Holds 3-to-1 Edge In Steel

**Russia and satellites made slight gain in steel production battle with Free World in '56 . . . But steel strike in U. S. was a big factor . . . Mills in Europe face materials and financing problems—By J. B. Delaney.**

♦ THE FREE WORLD still holds a 3-to-1 edge in steel production over countries behind the iron and bamboo curtains.

An IRON AGE survey of world steel output in 1956 reveals that the U. S. and non-communist countries poured an estimated 236.6 million ingot tons of steel, compared with approximately 76.1 million tons by Russia, China, and other Red-dominated nations.

This represents a 3.1-to-1 margin for the free nations, a slight reduction from last year, when the ratio was 3.3-to-1. Last summer's 34-day steel strike in the U. S. was largely responsible.

An important thing to remember is that steel production in free nations, particularly the U. S., is dictated by economic conditions—that is, demand from non-military industries. Not so in Russia and her satellites. In these countries, steel is channeled (1) into military, (2) into military-supported industries, and (3)—what is left—into civilian goods.

U. S. steel production this year will reach an estimated 236.6 million ingot tons, compared with a reported 76.1 million tons for Russia, an edge for the U. S. of 2.1-to-1. This is a comedown from eight years ago, when the ratio

was 4.75-to-1, when U. S. output was 88.9 million tons, compared with 18.7 million tons for Russia. But the difference in tons is still big—60 million tons today compared with 70.2 million in 1948.

On the basis of figures developed by the Business and Defense Services Administration, Dept. of Commerce, both West and East operated close to capacity in 1956.

BDSA reports Free World capacity at the start of the year as 250.8 million net tons, compared with estimated production of 236.6 million tons.

Capacity of Red-dominated countries as the year began was

approximately 76.2 million tons. Actual production was estimated at 76.1 million tons.

World expansion plans give another side to the steel story. Free World countries, according to BDSA, will have ingot capacity of over 300 million tons by 1960. Soviet orbit countries have set their sights on reaching capacity of 107 million tons during the same period.

This would give the Free World 73.7 pct of world capacity, compared with 76.7 pct today. But as BDSA points out:

"The figures shown for 1960, except for the U. S. and Canada, are planned figures announced by the respective governments, and have varying possibility of realization."

#### Skeptical of Reds

Some observers are beginning to doubt the claims of industrial progress made by satellite countries. And at least one Red nation—Poland—has admitted to taking liberties with the facts.

A United Press dispatch from Warsaw quotes the Communist

Party paper Trybuna Ludu as saying that claims to industrial improvement in the Stalin era were mostly myths.

"In industrial development we are about 10 years behind the chief European capitalist countries and about 30 to 40 years behind the United States," said Trybuna Ludu.

Due largely to the U. S. strike, steel production in the Free World countries rose only 4 pct over 1955, compared with a 10.7 pct advance for the Red nations. But percentagewise, the Reds' share of world output rose only from 23 pct in 1955 to 24.4 in 1956—an increase of 6.1 pct.

Most of the difference is accounted for in the decline of U. S. steel production from 117 million tons in 1955 to 115 million tons in '56—a drop of 1.7 pct. Russia meanwhile increased her production from 49.9 million tons to 55 million tons, an advance of 10.1 pct.

The problems facing many European steel companies trying to expand production and capacity were spelled out at a meeting of

West German steel leaders in Dusseldorf recently. Raw materials and financing are the biggest ones.

Despite West German plans for increasing home production of iron ore and coal, the present gap between supply and demand is expected to widen. Much of the planned steel expansion will have to be based on imports of both.

#### Where World Steel Is Produced

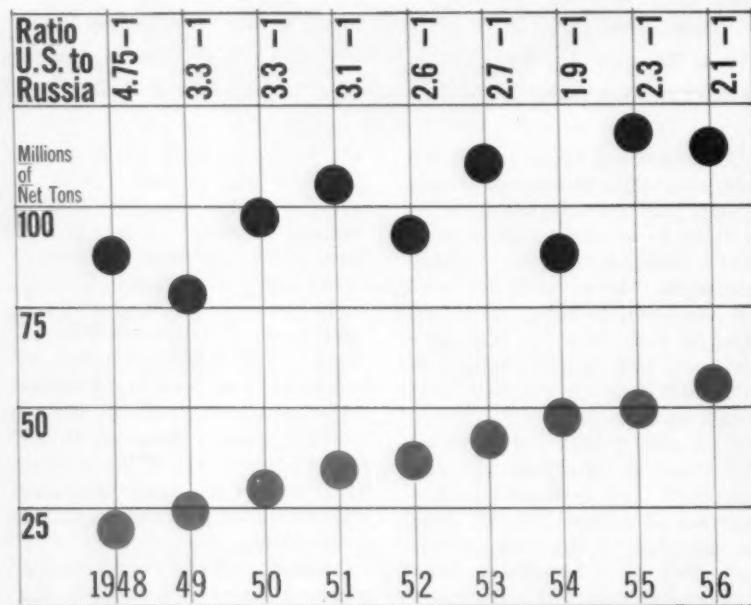
(Millions of Net Tons)

RED COUNTRIES	1956	1955
China	4.0	3.1
Czechoslovakia	5.7	5.4
E. Germany	3.0	2.8
Hungary	1.9	1.8
Poland	5.5	4.9
Roumania	1.0	0.8
USSR	55.0	49.9
Total	76.1	68.7

FREE WORLD	1956	1955
Australia	2.8	2.5
Austria	2.3	2.0
Belgium	7.0	6.4
Brazil	1.4	1.3
Canada	5.5	4.5
France	14.8	13.9
W. Germany	26.0	23.5
India	1.9	1.9
Italy	6.5	5.9
Japan	12.1	10.4
Luxemburg	3.9	3.6
Mexico	0.6	0.6
Netherlands	1.2	1.1
Saar	3.8	3.8
S. Africa	1.7	1.7
Spain	1.4	1.3
Sweden	2.7	2.3
United Kingdom	23.2	22.2
U. S.	115.0	117.0
Yugoslavia	0.9	0.9
Others	2.2	1.8
Total	236.6	228.3

#### Steel: Free World and the Reds

(Millions of Net Tons)



## TANKERS: Big Rush to the Shipyards

**U. S. shipyards have orders for 102 tankers . . . Not all the rush can be blamed on the Suez . . . Tankers were needed even before Nasser made his move . . . Problem is to speed program—By N. R. Regeimbal.**

♦ AS A RESULT of the Suez-triggered rush for new tankers, U. S. shipyards are now building or have orders for 102 large vessels.

Steel requirements for these huge ships run to about a million tons.

Some of this tremendous steel tonnage has been delivered, but an estimated 700,000 tons, or more, will be needed by 1960 to build these ships. Most of it is in scarce heavy plate. Large tonnages of structural steel are also needed.

Steel requirements will go even higher if—as expected—orders for new tankers continue to pour in, and could be boosted again should the government get into the act with its own forced-draft tanker program.

### Behind the Boom

The Suez crisis is only a catalyst in the tanker construction eruption, not the cause. Two factors are primarily responsible: Nearing mass obsolescence of the World War II-built tanker fleet, and new tanker operating economics which make it cheaper to move oil in tremendous supertankers, 40,000 to 100,000 deadweight tons, rather than smaller ships.

A third factor behind the tanker rush is the growing world demand—military, industrial, civilian—for more oil.

Orders for new large tankers began increasing in mid-summer immediately after Nasser's seizure of the Suez, and became a deluge when open warfare began in October.

Most of the shipyard ways capable of building the larger tankers are booked up for the next three to four years. They can't speed up work much because of delays in getting steel.

If steel were available, there are some ship ways presently idle which could be reactivated, government officials say. It takes from 12 to 16 months of steady work to build a large tanker. More steel and more ways in operation could bring many of these ordered tankers to launching a year or more sooner.

### How To Speed Up

Government mobilization planners are now wondering what, if anything, to do to speed up tanker construction. Voluntary allocations by the steel mills have been mentioned, but the mills are already doing that for freight cars, and they are protesting that this puts them in the position of cutting off some regular customers.

On Nov. 1, there were 32 tankers under contract, totaling 976,000 deadweight tons. On Dec. 15, the number of ships slipped to 31, but the tonnage was up slightly.

These 31 ships consist of 24

tankers being built for private interests and 7 being built for the Military Sea Transport Service by the Maritime Administration.

In addition, there are currently 12 ships on the ways for conversion and improvement for private operators, totaling 196,000 tons. All these are private ships, and with the 31 new vessels, will take some 400,000 tons of steel.

The list of tankers given tentative approval by maritime officials for future instruction is imperative. Of these 55 ships, one is in the dreadnaught 100,000 ton class; three of 65,000 tons; four of 60,000 tons, and the remainder running from 25,000 to 46,000 tons. These ships will take over 500,000 tons of steel. All will be built for private operators.

All of the immediately usable tankers are being withdrawn from the mothball fleets and put back into service. MSTS will get 33 tankers out of storage, and another 6 will be sold by the Maritime Administration to private operators. That's all there are.

### Who's Building New Tankers

- A shipbuilding boom is underway, touched off by the Suez crisis and deeply rooted in nearing mass obsolescence and new ship operating techniques.
- Some 102 tankers are now under contract or definitely planned.
- Steel requirements for these ships are about a million tons—700,000 tons or more will be needed for these ships in the next three or four years.
- Of the total, 79 are for private operators; 11 are for the Military Sea Transport Service; 12 are major conversions and improvements in existing vessels.
- Government is taking 39 tankers out of mothball fleets—all that are available. Thirty-three are for military use, but this will free very few ships for commercial service.

## FOREMEN: Don't Keep Them In The Dark

**NMA holds conference, polls foremen . . . Supervisors cite more information Number 1 on their Want Parade . . . Also requested, better understanding of what is expected of them—By G. G. Carr.**

♦ TAKEN TIME to confer with your foremen lately? You may be surprised at how eager they are for the latest on company operations and policy.

Over 400 delegates attended a recent National Management Assn. convention. They represented 387 companies in 34 states and Canada. Fifty-two pct were first level supervisors or foremen, the remainder staff and high level management.

Delegates were asked to rate six aspects of company-supervisor relations. Here's the results.

**(1) More and quicker information from top management on both policies and decisions.**

Ranked 1st by 36 pct.  
Ranked 2nd by 69 pct.

**(2) Better understanding of just what is expected of the supervisor.**

Ranked 1st by 26 pct.  
Ranked 2nd by 53 pct.

**(3) More participation by the supervisor in management decisions.**

Ranked 1st by 18 pct.  
Ranked 2nd by 36 pct.

**(4) More training.**

Ranked 1st by 15 pct.  
Ranked 2nd by 31 pct.

**(5) More authority.**

Ranked 1st by 2 pct.  
Ranked 2nd by 8 pct.

**(6) More pay.**

Ranked 1st by 3 pct.  
Ranked 2nd by 8 pct.

NMA research director Norman George believes the survey does not show lack of interest in more pay, authority or training. Rather, "the answers do reflect deeper concern for inter-management relationships, at least for the present."

On how well top brass understand supervisory problems, 34 pct

think executives understand most problems, 59 pct credit the boss with grasping "some but not all." Seven pct see "little executive understanding."

### Help Wanted

Supervisors would appreciate help. To the question ". . . how helpful is the personnel of the industrial relations dept. in dealing with employee grievances . . .", 54 pct answered very helpful, 29 pct reported some help, and 17 pct say "not too helpful."

Automation will cause few new management-labor problems for 6 pct. Forty-two pct anticipate "some new problems requiring special attention," while 52 pct foresee "many new problems requiring careful management consideration."

### Golden Years

Twenty-four pct call a college education very important, 75 pct helpful, but not required, and only 1 pct dismiss it as of no value.

Retirement at age 65 gets overall approval. Fifty-four pct like it as a general rule with exceptions, 22 pct want it as blanket policy, and 24 pct are against it.

Summing up the findings, NMA executive vice president Marion N. Kershner stresses, (1) Top management should realize foremen and supervisors are the backbone of their business, (2) A first line supervisor is a management man, not a glorified monitor.

Both of these views are expressed, practically word-for-word, on several of the survey replies on methods for improving the supervisor's job and position. Mr. Kershner feels they are "typical of frustration felt by many supervisors of handling more management responsibility."

### What The Foremen Want

Here are some of the write-in ballots from supervisory personnel on the National Management Assn.'s Company-Supervisor relations survey.

**"More concentration on communication and education of top management as to line problems and understanding of labor force"—Dept. Mgr.**

**"The immediate need is to draw all levels of management closer together to better coordinate all management thinking"—Foreman, sheet and tubing manufacturer.**

**"More top management support in helping to carry out supervisory decisions"—Supervisor, industrial machine co.**

**"Greater appreciation of supervisors' efforts—expressed verbally and financially"—Asst. Superintendent, electrical utility co.**

## THE LABORATORY: Where Profits Begin

**Industry is spending more each year on research and development projects . . . Even small firms are getting the jump on new products and process improvements . . . Close relation found between profits and research.**

♦ IS YOUR COMPANY'S research and development program keeping pace with its competition?

If it isn't, you soon may be losing ground in your competitive field as well as missing out on new business, sales and profits.

The growing amount that is spent each year on RD (research and development) is pretty well documented. RD costs this year will reach about \$7 billion, with some \$4.5 billion of it done by private industry.

This amount has jumped from \$5 billion in 1953, when industry's RD cost was about \$3.7 billion. Between 1953 and 1954, the cost rose about 12 pct, from \$3.7 billion to over \$4 billion.

Just what an RD program can mean to you is evaluated in a new study by the Assn. of Consulting Management Engineers.

It points out that in addition to major industries, medium and small firms are also going in for more extensive RD programs. It concludes that "there is a close correlation between research expenditures and profits."

In evaluating the purposes of an RD program, the association provides this breakdown:

1. Pure research—continuing search for radically new ideas, break-throughs of scientific frontiers.

2. Commercial development—improvement of existing products or development of new products through application of already available ideas or combinations of ideas.

3. Engineering—setting up pilot plants, devising manufacturing processes, and taking the bugs out of actual production.

4. Technical service—assistance on the problems of manufacture or product use, either in the company's plant or customer's plants.

Each category requires its own type of administration with its own goals and objectives.

Some small but highly successful companies are founded on RD. Examples of these are found in the electronics industry, or any of the new, highly technical fields that are still in their early days of development.

A study of research and development by the National Science Foundation points out the scope of industry's RD projects. About 157,000 scientists and engineers were employed in RD activities in surveyed industries in 1954. Scien-



IT'S BELIEVED that the automakers spend more of their own money, percentagewise, on research than any other industry. Here Ford researchers study new types of window glass.

tists and engineers doing RD work were close to 30 pct of the members of their professions employed in all types of activities in private industry.

### Who Spends the Most?

What industries spend most heavily on RD programs?

The Science Foundation found that the aircraft and electrical equipment industries far exceed all others in the scale of their RD programs. In 1953, these two accounted for about \$1.5 billion in cost of research and development.

Next in order of RD expenditures are motor vehicle, chemical, machinery, professional and scientific instruments, petroleum, telecommunications and fabricated metal products. These industries account for about nine-tenths of the total cost of industrial RD.

Utilization of scientific and technical personnel is significant

### Where Industry Gets Its Research Done

Percent of Research and Development:

Size of Company	In own facility.	In own facility and outside.	Outside facilities [only]
8 to 99 employees	65.6	14.1	20.3
100 to 499	57.4	21.2	21.4
500 to 999	50.4	37.6	12.0
1000 to 4999	44.0	46.9	9.1
5000 or more	26.3	68.6	5.1
All Companies	60.8	20.1	19.1

Source: National Science Foundation

in RD programs. Aircraft manufacturers used nearly three-fifths of their scientists and engineers in RD work in 1954. In contrast, only 1 of every 7 scientists and engineers employed in the primary metal industries was engaged in RD work.

#### Outside Help

Not all RD work is accomplished by companies in their own plants and laboratories. Many, particularly those of smaller size with limited facilities, utilize outside organizations such as commercial laboratories, private non-profit research institutes, colleges and universities, and trade associations.

In 1953 more than a fourth of all companies with RD programs of their own also sponsored programs outside their own companies. Many companies without programs of their own supported programs by outside organizations.

In these days of major expenditures by the federal government, particularly for defense, the role of government in RD programs is more and more significant.

#### The Index of Return

In 1953, for example, close to \$1.4 billion of the total cost of industrial research and development represented work done for the U. S. government, either as prime contractor or as subcontractor for research and development. (Only about \$9 million came from other sources such as state or local governments.) This is compared with the \$2.3 billion incurred by companies for their own projects.

Most companies that have programs limit their estimates of returns to projects that result in new products or lower costs.

One formula of evaluating research results attempts to measure the return on the entire program. An "index of return" is computed for each type of project as follows:

Process improvements are credited for process savings for one

year; projects resulting in improved products are credited with 2 pct of the sales value for two years, and projects resulting in new products with 3 pct of the sales value for five years. An overall index of return on the entire program is the sum of the values of the individual projects. These percentages have been changed and are subject to additional change on the basis of experience.

Increased emphasis is also being placed on basic research. But private industry as a whole spent only about \$150 million in 1953 on basic research, or about 4 pct of the total RD outlay.

The chemical industry spent an estimated \$38 million that year on basic research, about 25 pct of the total for all industry. Electrical equipment and aircraft spent \$19 million and \$18 million re-

spectively. Manufacturing, including motor vehicles, spent about \$12.5 million, primary metals less than \$5 million.

In basic research, chemistry accounted for nearly two-fifths of the total basic research cost, and research in engineering about one-third.

#### Costs Are High

It takes a lot of money for industry to support one scientist or engineer in RD. The average cost of RD per scientist employed was \$27,000 a year in 1953. Obviously, the cost per year is much higher now as competition for engineering personnel increases.

Average ratio of RD cost to sales was 1.7 pct (also in 1953) for medium size companies. In aircraft, the ratio is as high as 5.9 pct.

### Does U. S. Research Spending Hurt Competition?

◆ THE JUSTICE DEPT. trust-busters are becoming increasingly concerned over the impact of skyrocketing government research spending on competitive conditions in the economy.

The Attorney General is fearful that the handicaps small firms encounter in seeking government research contracts, and the residual benefits firms who get the contracts receive, may be helping to increase economic concentration in big firms. He is seeking congressional study of existing patent policies, with a view toward having the government pay the entire cost of research contracts and take title to any patents that result.

#### The Implications

"It seems obvious," Mr. Brownell says, that present research programs have "grave implications for the future of a freely competitive economy."

Of the present \$7 billion a year being spent on research and development, some \$4.5 billion is done by private industry—and more than \$2.5 billion is paid for by the government. Total government research expenditures, including that done in its own lab-

oratories, amounts to about \$3.5 billion a year.

The problem, as Mr. Brownell sees it, is that the actual cash profits flowing to a firm doing government research are only a part, and probably a small part, of the total advantages the firm receives.

#### Hurts Small Business

Defense research, he says, has resulted in the creation of products and the accumulation of technology with highly profitable commercial applications. The results of research, he adds, are practically unreachable except as the researcher chooses to disclose them—he alone may suppress his knowledge or use it within limits solely for private advantages.

He also contends that firms with government research and development contracts have wide competitive advantages in the hunt for new scientific talent because of their large research budgets and because recruiting charges and higher salaries can be added to the cost of the contracts.

Small business is hampered in many ways from full participation in the current research race—and thus may be falling further and further behind competitively, Mr. Brownell fears.

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## PLUMBING: Rides With Construction

**Decline in homebuilding is offset for plumbing fixture producers by trend toward 1½ and 2 baths per home . . . Counter type kitchen layouts boost steel sink sales . . . Vitreous china a formidable competitor.**

♦ METAL PLUMBING fixtures and fittings are in a slight sales dip but not enough to reverse a pattern of long term growth.

Estimated shipments of \$459 million in 1956 represent a drop of 10 pct from 1955. However, 1956 business compared favorably with shipments of \$441 in 1954 and \$298 in 1947.

The ups and downs of plumbing sales correspond closely with the rate of construction activity. Value of new construction jumped from \$14 billion in 1947 to \$20.9 billion in 1954 and \$34 billion in 1955. (adjusted to 1947-49 dollars.)

In 1956, industrial construction was high but new housing

starts were down from 1.3 million units in 1955 to an estimated 1.1 million. These figures show a lag of nearly 20 pct. However, the value of new homes declined only 9 pct.

The difference comes partly from a trend toward bigger homes. Where the average development house in the immediate postwar period had only one bathroom, today's homes are being built with 1½ and 2 baths.

Fixtures and fittings have benefited about equally from this trend. In 1954, sales of metal fixtures came to \$208 million. These covered sinks, bathtubs, lavatories and other pieces that hold water. In the same year, sales of fittings

were \$215 million. Fittings include drains, faucets, stops and other water carrying devices.

### Vitreous Trend

In the kitchen sink line, there has been a trend away from cast iron construction and toward steel. In 1951 there were 1.19 million steel sinks sold and 1.21 million cast iron. In 1955 there were about 500,000 more steel sinks sold than cast iron.

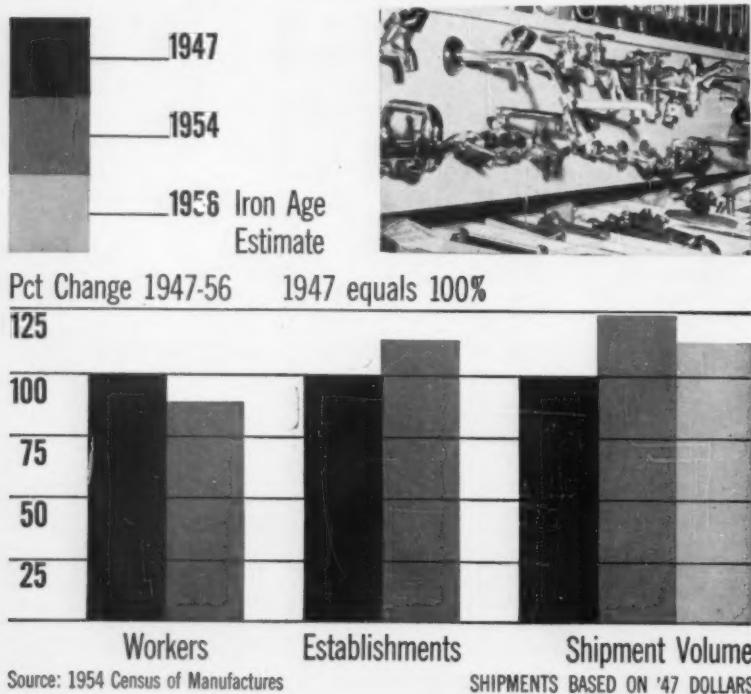
This turnabout is attributed to the growing popularity of counter type kitchen outlays, and the importance of steel's weight advantage in built-in assemblies. Cast iron is used for the majority of service sinks.

Trend today in lavatories (bathroom basins) is toward vitreous china and away from metals. In 1951 there were 1.6 million cast iron lavatories shipped and 1.4 million vitreous china. By 1955, shipments of cast iron units had declined to 1.5 million while the vitreous china type had increased to 2.1 million.

From a numerical standpoint, bathtubs are the biggest seller among metal fixtures. Nearly 1.7 million cast iron tubs were sold in 1955. Over 600,000 steel tubs were sold.

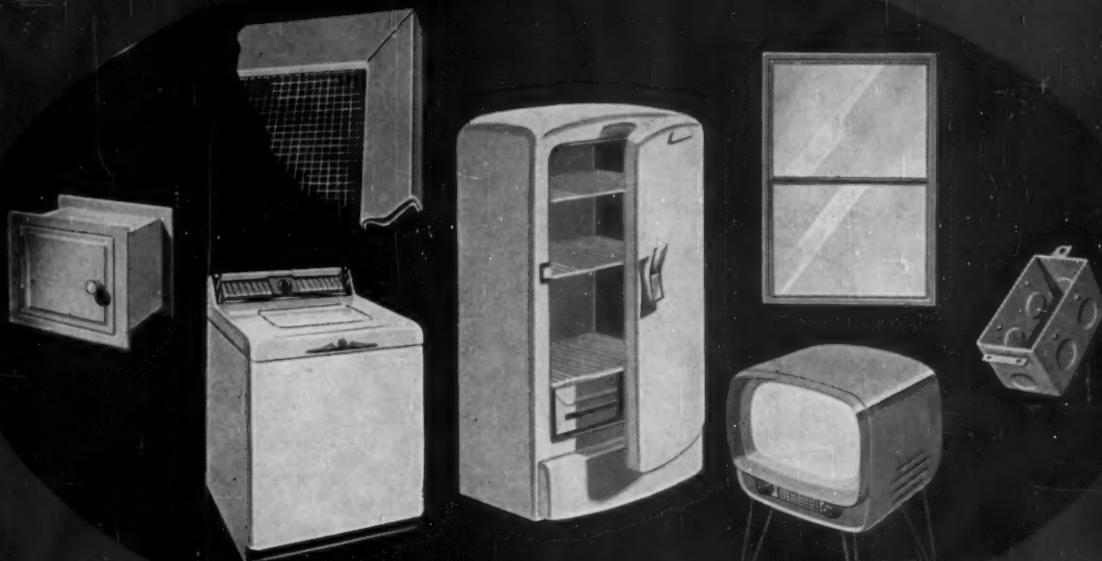
In new construction, the stalls are generally built up of tile; where a house is being remodeled, metal stalls are favored. Shipments of steel stalls have increased from 133,000 in 1947 to 176,000 in 1954. Overall shipments of fittings rose from \$159 million in 1947 to \$215 million in 1954.

### No Stoppage In Plumbing Gains



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## REPORT TO MANAGEMENT

**What's Labor Up To Now?**

For years labor has locked horns at regular intervals with the most successful and largest industries. It has taught some lessons in that time, and learned a few too.

**One most significant lesson** that labor has picked up from industries that practice it is the philosophy that to stand still is to go backwards.

**On the surface, most industry** can look forward to a period of comparative labor peace. This is based on the current long-term labor contracts in effect in most major industries.

**But it can't be assumed** that labor will stand still in that period—or that contract negotiations three years from now will take up where they left off last summer. Labor has trained its sights upward, has bigger things in mind than cents per hour and extra pay for holidays.

**White Collars and Engineers**

Labor's next big objective will be the organization of white collar workers, the last frontier of unorganized employees. (See This Week In Washington, p. 41.)

**You probably have noticed** engineers are also restive, that 12 pct are now union members. Put these two groups together and you have an idea of what to expect from labor in the upcoming months.

**And there is no reason** to feel too secure behind a three-year labor contract. The "living documents" theory that was raised by the United Auto Workers can be expected to rear its head again. This can happen if your labor union feels that inequities have crept in or if a public issue can be raised over points of the contract under changing conditions.

**Meanwhile, labor policy makers** will be laying the groundwork in the next year or so for the short work week, full (or more nearly so) unemployment benefits, and other points that are unique in each industry.

**There is no indication** of undimmed confidence in labor. The latest "Political Memo from COPE" boasts that "no winning candidate campaigned on anti-labor platform." Labor also feels that the Administration is committed to friendly labor policies.

**You Can't Get Away from It**

It's virtually impossible to escape the continuing ramifications of the current tight money situation. If you're in business, or even just a private citizen on a salary, it's going to hit you in the upcoming year.

**If you're serving on your local** school board or city council, you may have found it impossible to borrow for that needed school or improvement—or the interest rate at nearly prohibitive levels.

**Borrowing continues at a** new high. Latest figures show that the volume of security issues, both corporate and municipal, will be about \$15.5 billion this year; compared with the previous record of \$14.5 billion in 1955.

**There now appears to be** little chance of an easing of credit in the immediate weeks ahead. Although the FRB has been roundly criticized, a great deal of support from unexpected areas has rallied behind the so-called tight money policies. At least temporarily, the heat is off Mr. Martin and his policies.

**There are possible exceptions** to this rule of thumb. Defense industries, for example, that need to borrow for capital expenditures may find their credit eased. Theory is that the money is needed for defense purposes and excessive interest rates would add to cost, while not helping to halt inflation.

## INDUSTRIAL BRIEFS

**In The Orbit . . .** The Globe Woven Belting Co., Inc., Buffalo, N. Y., has joined The Material Handling Institute, Inc. As a manufacturer of belting for conveying, elevating and power transmission, the company will be active in the Conveyor Product Section.

**Tooling Up . . .** During the past fiscal year, The Federal Machine and Welder Co. embarked upon a program of acquiring needed new machine tools. The company placed orders for approximately \$750,000 worth of new equipment and facilities. New machine tools, when in full operation, is expected to increase the plant capacity by approximately \$1.5 million annually.

**Pressure Group . . .** The Union Carbide Research Institute has been formed to engage in basic scientific research. It will be located near Tarrytown, N. Y. The Institute's major purpose is to contribute fundamental knowledge by studying the physical and chemical behavior under ordinary and extreme conditions of pressure and temperature.

**Check Your Distributor . . .** The Hamilton Steel Warehouse of Jones & Laughlin Steel Warehouse Div. has been appointed distributor of Reynolds Aluminum mill products. The appointment will increase industrial aluminum products in the Cleveland marketing area.

**Hose Brigade Wanted . . .** H. K. Porter's Quaker Rubber Div. has constructed a discharge hose more than 250 ft long. The Quaker hose has an inside diameter of four inches and withstands pressures of 250 pounds per square inch. It weighs more than 800 pounds and for ease of handling has built-in brass carrying rings.

**Smoothy . . .** Harry F. Vickers, president of Sperry Rand Corp., founder of Vickers Inc., received the ASME Medal for 1956. The award is for distinguished service in engineering and science. Mr. Vickers was cited in particular for "Pioneering in industrial oil hydraulics and for notable accomplishments in business leadership."

**Downfield Blocking . . .** Educational grants for 1956 by Inland Steel Co., subsidiaries and divisions amounted to \$319,950. This is an increase of \$108,000 or 50 pct as compared with 1955. Major portion of the grants were given to private institutions of higher learning.

**What's in a Name . . .** Hagan Corp. is changing its name to Hagan Chemicals & Controls, Inc. Its subsidiaries, Calgon, Inc., Hall Laboratories, Inc. and The Buromin Co. will be merged into the parent company. Calgon and Hall will continue as divisions.

**Letting Out Seams . . .** American Can Co. has begun expansion programs at two East Coast plants and has completed major renovation at a third. Involved are Canco's Hillside, N. J., Needham, Mass. and Baltimore, Md. plants. Production is 1.9 billion containers a year and provides approximately \$11.5 million in payroll and employee benefits for about 2,000 people. The Baltimore plant has completed a \$750,000 renovation of its packaging and shipping facilities.

**Cabinet to Bureau . . .** Dr. Arthur F. Burns, who resigned as chairman of the President's Council of Economic Advisors, has been elected president of the National Bureau of Economic Research. Gottfried Haberler, professor of economics, Harvard University, has been elected chairman of the board.

**Safety Catch . . .** Products for industrial safety will be featured by E. F. Houghton & Co., Philadelphia, in its display at the Plant Maintenance Show late in January in Cleveland. Houghton will demonstrate a fire-resistant hydraulic fluid, Houghto-Safe, a rust preventive compound known as Rust Veto M.P., which is soluble in water. It is used as a cleaning compound to replace low flash solvents on the production line.

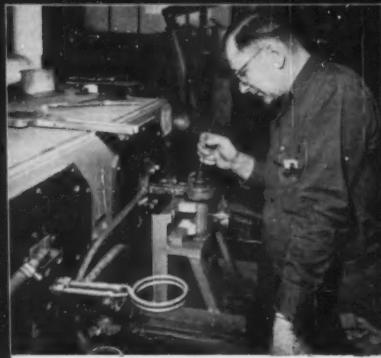
**Tough Grind . . .** Kennametal Inc. has begun full-scale production in a new plant near Latrobe, Pa. The company will house the Special Products Grinding Dept. of the Latrobe firm.

**Pipe This . . .** Alpha Plastics, Inc., Livingston, N. J., has completed its new plant for production of PVC pipe and tubing. The facility will increase production of corrosion resistant pipe for chemical and related industries.



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15 KW, 10,000 cycle TOCCO machine.

## with TOCCO\* Induction Brazing

### Brazing Costs Down

When Jack & Heintz engineers switched from torch brazing to automatic induction, brazing cost of these inverter brush mounts fell from \$.05 to \$.006 each—a reduction of 83% in direct labor costs alone! Additional savings result because less cleaning is required after TOCCO, and fuel costs are much lower, too.

### Brazing Production Up

While costs dropped, production on the part zoomed—from 40 to 360 brazed assemblies per hour. Furthermore, rejects and scrap, formerly high, are now negligible.

### Versatility

The part shown is just one of over 25 parts, large and small, which alert J & H engineers have converted from old-fashioned brazing methods to modern, automatic TOCCO. Overall brazing costs (TOCCO brazing versus former methods used) are down 75%—brazing speed, up 100%.

\* \* \*

If the manufacture of *your* product involves brazing, heat-treating, forging or melting of ferrous or non-ferrous metals, don't overlook TOCCO as a sound method of increasing production, improving product quality and slashing costs.

THE OHIO CRANKSHAFT COMPANY



TOCCO

NEW FREE  
BULLETIN

THE OHIO CRANKSHAFT CO.  
Dept. A-12, Cleveland 5, Ohio

Please send copy of "Typical Results of  
TOCCO Induction Brazing and Soldering".

Name \_\_\_\_\_

Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



## Why Chevrolet's Depth Is Hard To Beat

**No. 1** producer's new engineering center is last word . . . But it takes depth of resources to compete in Big Three . . . Wealth of Chevrolet points up problem of independents today—By T. L. Carry.

♦ THE PLIGHT of the independent producers in the automobile industry has sometimes been over-emphasized. There has been a tendency on the part of industry observers to deplore the state of small automakers to the point where a lot of things that are said are not exactly true.

But the fact still remains that the independents have a real fight on their hands if they are to compete on anywhere near an equal basis with the large producers.

This fact was never brought home more forcefully than during a recent personal tour of the newly completed Chevrolet engineering center on the outskirts of Detroit.

**Nothing To Be Denied . . .** Facilities and personnel at the new installation leave absolutely nothing to be desired. And you can't

help but wonder how the small companies can keep up with such a display of resources.

Chevrolet's resources may not be any better than some others of the Big Three, but they far surpass anything that the remaining producers have to work with.

This is illustrated more graphically when you consider a few of the facts which were neatly demonstrated by Edward N. Cole, general manager of the Chevrolet Div.

Compared to this year, it was a simple matter to produce a car in 1950.

**Not the Same . . .** At that time, Chevrolet had only two transmissions and one 6-cylinder engine. But to keep up with the times, the division now has four transmissions and five basic engines which it can put on cars.

In other words, mass production

### New Mercedes-Benz Low, Powerful



ANY SPORTS CAR fan would get a kick out of driving this new Mercedes-Benz. The European sports car manufacturer will introduce a new 300SL Roadster in the summer of 1957, featuring a 6 cylinder gasoline fuel injection engine with a maximum speed over 150 mph. Horsepower rating is about 240. It will seat two and be only 33 inches high at the door.

is becoming more and more customized. And even if you have the engineering talent, but you lack the facilities to keep pace with the big operators, it may be only a matter of time until your company is relegated to the sidelines.

For example, in 1950 Chevrolet was producing 14 passenger car models and 81 different types of trucks. This year, the division has reached the point where it has 21 different passenger cars and the number of trucks available has grown to 103 models.

**Takes Money . . .** This sort of thing doesn't happen overnight. It takes manpower, modern facilities and a lot of money. Money, incidentally, is one commodity which the independents are sadly lacking.

Another thing to keep in mind is that the progress doesn't stop at this point. Things are going to keep improving and the squeeze is going to tighten up even more.

Completion of the new Chevy center marks the end of an era for the GM division. Previously, Chevrolet's engineering facilities were scattered over six locations in the city of Detroit. Some engineers were even located in an abandoned bank building across the street from the General Motors building.

Now, major engineering activities are located under one roof.

The location couldn't be more ideal. The new center is directly across from a similar facility for the Fisher Body Div. and it is practically next door to GM's technical center.

Chevrolet has all the facilities

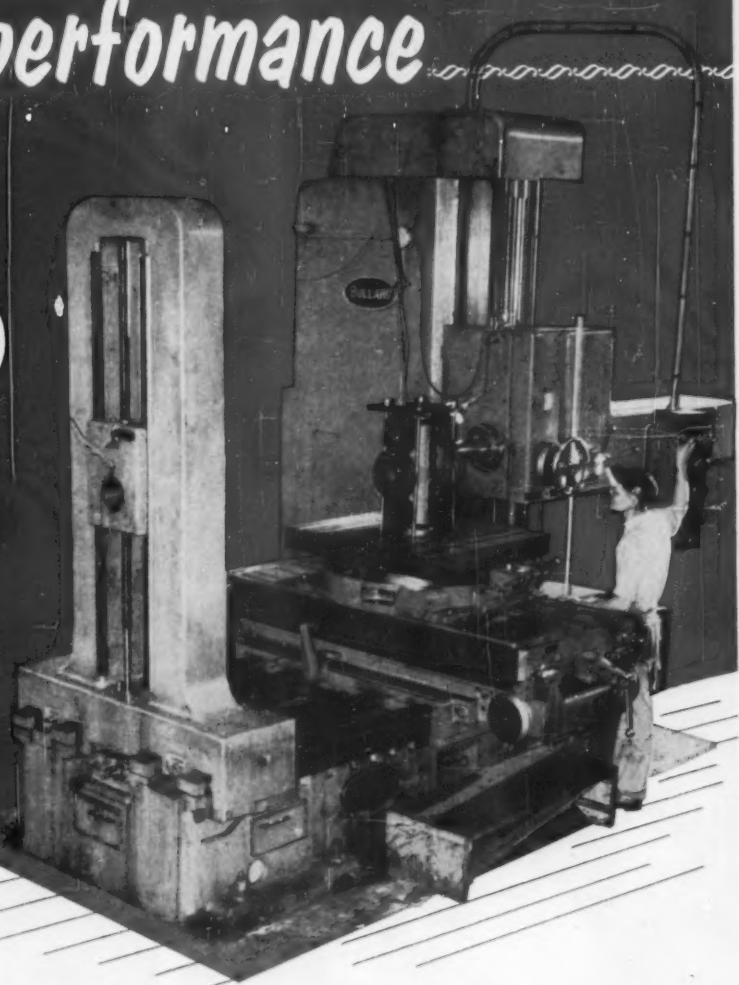
"we're getting **TOP** performance

from our



**H.B.M.**  
Model 75

GAS CYLINDER CASTING  
FOR COMPRESSOR

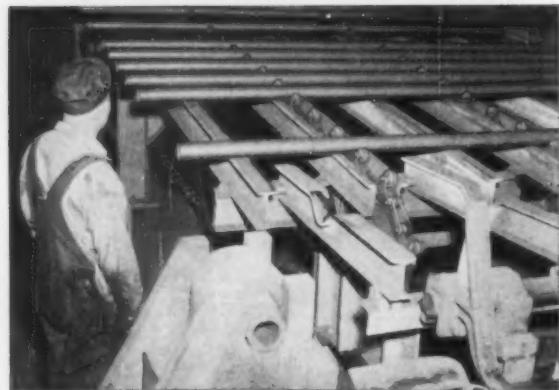


"The acquisition of our Bullard HBM, Model 75 has eliminated a production bottleneck by giving us a reliable machine to handle our output" says Mr. Frank A. Kocevar, Chief Industrial Engineer at The Joy Manufacturing Co., of Michigan City, Indiana, manufacturers of portable and stationary compressors for industry.

This "built-in reliability" of the Bullard HBM, Model 75 can be applied to your boring, milling, drilling and facing problems — check its outstanding features by calling your nearest Bullard Sales Office or Distributor or for a complete catalog, write to —

THE BULLARD COMPANY  
BRIDGEPORT 9, CONNECTICUT

# Specify longer-lasting Link-Belt Promal chains for extra durability



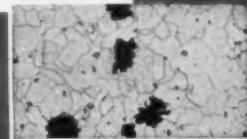
## Promal chain controls uniform cooling of pipe

An inclined conveyor, using Link-Belt Class 1100 Promal chain with attachments, permits an Ohio steel mill to control cooling of longer tubes than previously possible. Pipe is received from hot finishing operations at temperatures up to 1800 F. Controlled chain speed permits uniform cooling of outer tube periphery.

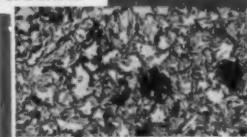
HEADQUARTERS FOR CHAINS, SPROCKETS is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

### MALLEABLE



### PROMAL



MICROPHOTOS show difference between ordinary malleable iron and Promal. Upper—white areas in malleable microphoto represent "free-iron" . . . black shows soft nodules of carbon. Lower—the dark areas in the Promal structure show stronger, stiffer reinforcing material which strengthens metal and resists distortion and wear.

►UP TO 475 TONS of steel mill scale are recovered by this Link-Belt system. Class 700 Promal chain on Straightline Collector moves scale from settling tanks to discharge conveyor. Promal is especially suitable for long, heavy-duty conveyors and elevators.

Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads—and wear resistance supplies the durability to cope with severe abrasion.

Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasion.

For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.

## Where and how to apply Promal in the metal working industry

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much

longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.



HEAT-RESISTANT PROMAL is recommended for temperatures up to 1000 F. This SMGL-618 Promal chain conveyor with riser attachments picks up and conveys sheet steel through furnace. Chain has operated continuously for two years without failure.

# LINK-BELT

CHAINS AND SPROCKETS



14-201

## Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Dec. 22, 1956*	175,000	26,000
Dec. 15, 1956	172,243	25,920
Dec. 24, 1955	161,198	21,266
Dec. 17, 1955	175,638	28,180
TO DATE 1956*	6,086,852	1,195,438
TO DATE 1955	8,226,038	1,316,280

\*Estimated. Source: *Ward's Reports*

at its finger tips which are needed to produce more and better cars. Meantime, the independents are more hard pressed to crack the competitive barriers which are being set up by the Big Three.

## New Packard

Production of the 1957 Packard Clipper has just started in South Bend. It is the first time in 53 years that a Packard has not been produced in Detroit and it marks a further effort on the part of Studebaker-Packard to reduce its costs.

Engineering specifications have not as yet been released on the new model. But it is obvious from looking at pictures that the 1957 version is a highly modified Studebaker.

The car will be produced on the same assembly lines with Studebakers and Hawks.

Many of the innovations introduced on former Packards will be missing on the 1957 Clipper. The most outstanding will be the absence of torsion bar suspension.

The new Clipper will compete in the medium price field. It is not known at this point whether the company intends to produce a luxury Packard but it is highly unlikely unless S-P earnings take a meteoric rise next year.

## The Gearshift Market

Automatic transmissions in automobiles continue to gain in favor. Estimates are that the industry sold 5 pct more of the units in 1956 than it marketed in 1955.

It may not be too long before nobody in the industry will be making a standard transmission.

Oldsmobile is already at the point where an Olds customer has

to pay extra if he wants a standard shift.

Plymouth is another indication of the increase in sales. Plymouth's percentage of automatic shift sales during 1956 averaged three times more than the average for all other cars during the same period.

The gain is attributed to the advent of push button controls. This may or may not be true. As for other automakers, push button driving went over like a lead balloon.

The only producer to copy it in 1957 is Mercury. Packard did have it in 1956 but it is not known at this time if the new model will keep the innovation.

## AUTOMOTIVE NEWS

saying that Ford Div. had the biggest November sales in the company's history.

Here is what happened:

On basis of dealer reports, Ford did outsell Chevrolet last month at the retail level, but only by a very few cars.

Statistics on retail registrations for November have not as yet been released by R. L. Polk & Co. and it's possible that a slight variation one way or the other could put Ford back in second place.

That's the big reason Ford has changed its claim. The company isn't taking any chances on being wrong.

But even if Ford did sell more cars than Chevy last month, it probably won't make much difference in the long run.

Chevrolet has been a slow starter in recent years. For example, Ford was leading the sales parade for the first half of 1955. But Chevrolet overtook the company in the last 6 months of that year and Ford never had a chance to recover during 1956.

## THE BULL OF THE WOODS

By J. R. Williams



# Cincinnati Gives You Push Button Convenience for Spindle Speed Selection



In your home, your workshop, practically everywhere you look push buttons are the ultimate in convenience. Now they perform an important chore in machine tool operation; they select spindle speeds on CINCINNATI® Dial Type Milling Machines at the front and rear operations positions. But convenience is not the only advantage. They also save time and reduce costs. How? In operating a toolroom miller, spindle speeds should be changed as often as the job requires. On CINCINNATI Dial Types, push buttons do it in a few seconds throughout the entire range of 18 to 1800 rpm for the No. 2 Machines, and 16 to 1600 rpm for the Nos. 3 and 4 Machines. And because it's quick and easy, the optimum cutting speed can always be used; cutting action is more efficient and there's less possibility of wrecking the cutter. There are many other CINCINNATI Dial Type advantages:

Power dual selection of feeds,  $\frac{3}{8}$ " to 90" per min. Independent, directional controls, with name knobs  
Automatic backlash eliminator  
Dynafoise chatter-damping overarm  
Automatic table feed cycles available for plain and vertical machines

Want more information? Look in Sweet's Machine Tool File for brief specifications; complete data in catalog No. M-1915.

THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI 9, OHIO

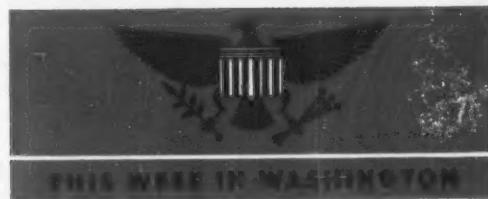
CINCINNATI NO. 2 UNIVERSAL DIAL  
TYPE MILLING MACHINE easily takes a  
heavy helical milling cut.

DIAL TYPE LINE		table traverse	main drive	automatic table cycles available
No. 2	Plain Universal Vertical	28"	10 hp	yes no yes
No. 3	Plain Universal Vertical	34"	15 hp	yes no yes
No. 4	Plain Universal Vertical	42"	20 hp	yes no yes

# CINCINNATI



MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES  
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS



## Labor Aims At White Collar Workers

**1957 will see big drive to organize office workers . . . Reuther admits difficulty, plans new organizing techniques . . . White collar group is traditionally cool on labor movement—By G. H. Baker.**

♦ AFL-CIO LEADERS are readying a fresh organizing drive for white-collar workers.

Active recruiting will get under way early in 1957. Union officials hope to schedule the first employee elections about mid-year. In these elections, the "front office" employees will ballot for or against union representation.

Plant management should think ahead now toward these coming membership drives. Decide on your company's course. Under the law, there's nothing you can do to prevent workers from joining a union of their choice. Legally, about all you can do is either (1) accept a union (if the workers vote for one) without a protest, or (2) convince the workers by legal persuasion that they're better off without a union.

**Untapped Source . . .** Union leaders recognize that the nation's white collar workers are the last great untapped source of union membership. Totals in the blue-collar unions are leveling off on a high plateau of about 16 million. The big organizing drives of the 1930s and 1940s have accomplished their goals. The leaders are now prepared to go after the "front office" help, which by temperament is not nearly so conditioned to unionism as the back shop.

In the past, unions have met with spotty success in trying to sign up white-collar workers. While generalizations cannot be pushed too far, it is nevertheless true that office workers are more individualistic than production workers. Most of them enjoy the

reflected prestige that comes from associating with top management, and thereby come to reflect management attitudes toward unionism. Walter Reuther, AFL-CIO vice president, says frankly "we will have to develop some new techniques."

"You can't organize office workers the way you organize foundry workers," Mr. Reuther admits.

Reuther estimates that there are a potential 13 million office workers that are fair game for unions, and only about 12 pct of them are now organized.

### To Ease Immigration

The Administration wants Congress to make it easier for waves of refugees from Communism to enter the United States.

True, the McCarran-Walter immigration law provides for the

ready admission to the U. S. of anti-Communists. What the Administration wants is a broadening of this law to make it possible for a large number of refugees to enter the U. S. without delay.

The events in Hungary in recent weeks show that the U. S. can expect tens of thousands of refugees from Communism to seek admission here when the Reds turn the screws so tightly as to make life unbearable behind the Iron Curtain.

Today, the refugees are streaming out of Hungary. Tomorrow, they may be exiting in large numbers from Poland, or from Roumania. The Administration wants to be ready for the next crack in the Iron Curtain. It wants to clear the way for refugees by erasing legal tangles now—not when the refugees begin streaming into U. S.

## Behind Defense Civilian Payroll Cuts

**New cuts in Army arsenal work forces don't necessarily mean that more contracting to private industry is planned.**

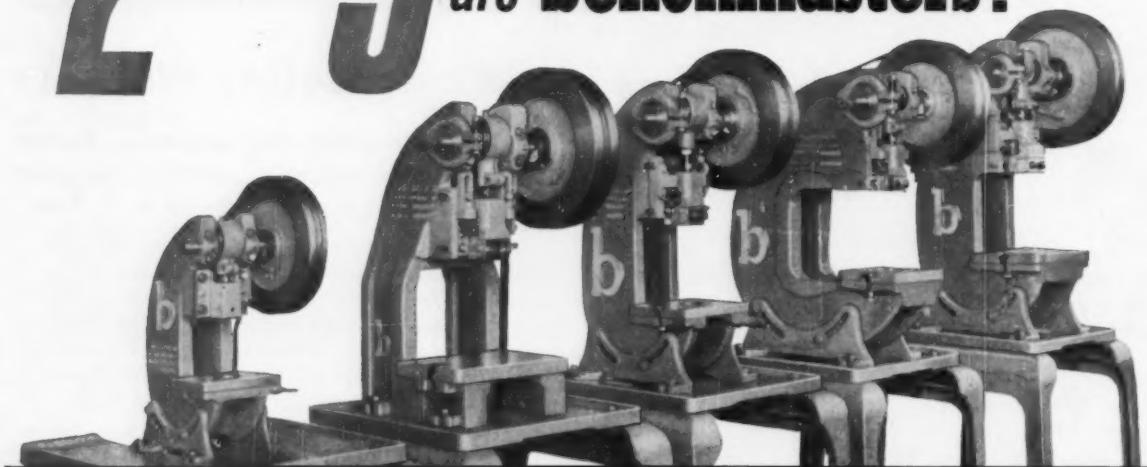
**Army spokesmen say that new reductions of 6000 employees from the payrolls of seven arsenals are to eliminate projects of low essentiality.**

**But in research and development areas, the Army may ask private firms to take on some activities.**

**At the same time, Navy spokesmen tell of a reduction of 20,000 civilian employees, or about 5 pct of the total, since October, 1955.**

**A labor spokesman, William H. Ryan, president of a Machinists local, contends the layoff program is not founded on available funds or work loads. He warns that the action may reduce number of employees, but probably at greater expense.**

# 2 out of 3 small presses purchased are benchmasters!



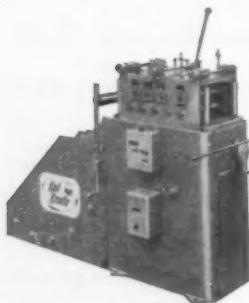
**That's a fact...** out of all small punch presses purchased 2 out of 3 are supplied by Benchmaster!

Being first choice by so wide a margin is no accident. First, Benchmaster builds small presses in 3 distinct capacity ranges... 2, 5 and 8 tons. Second, consider the various models available... plain inclinable models, backgeared types, deep throat presses, fixed bed gap frame types, half presses, multiple ram presses and special stroke models!

Add to this the complete range of Benchmaster Accessories... AUTOMATIC DIAL INDEX FEEDS, AUTOMATIC FRICTION ROLL FEEDS, ROLL STRAIGHTENERS, KOIL KRADLES, BARRIER TYPE GUARDS, CHUTE TYPE PRODUCTION PANS, ETC. And remember, Benchmaster's acceptance is world-wide—wherever you go there's a Benchmaster—and Benchmaster service!

When buying new presses choose the winner... *First in Sales, First in Quality, First in Economy!*

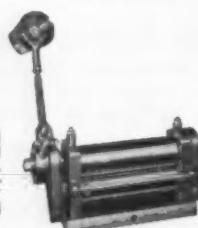
**Wherever there's a press operation,  
this Benchmaster Equipment  
will cut costs, save time!**



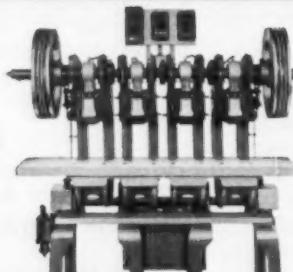
**BENCHMASTER STRAIGHTENERS**—(Shown in combination with Koil Kradle.) Adjustable, power driven rolls; removes kinks—straightens out coil stock before feeding to feed mechanisms or to press. Many sizes, write for details.



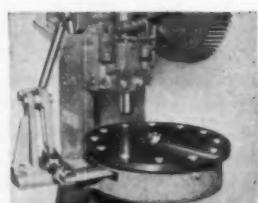
**BENCHMASTER KOIL KRADLES**—Automatically supplies a slack loop from which any machine can draw. Overcomes inertia of heavy coils—easier loading. Many sizes. Ask for data.



**BENCHMASTER AUTOMATIC FRICTION ROLL FEEDS**—A low cost roll feed made especially for all small presses. Has automatic roll lifters, feeds almost any material. Two models: 0-3" and 0-6" cutoff. 3, 5, 7 and 9" roll widths.



**BENCHMASTER MULTIPLE RAM PRESSES**—Any number of units required—rams can operate in unison, can alternate or can be staggered... all operate on same crankshaft... stroke lengths can also vary on each ram... separate die stages on each bed cut tooling costs, permit quick replacements. Costs  $\frac{1}{2}$  to  $\frac{1}{3}$  of large presses doing similar work; doubles production!



**BENCHMASTER DIAL INDEX FEEDS**—Links with ram, automatically indexes, placing new station under ram with each stroke. Up to 6000 strokes per hour. Cuts labor—makes your press operations almost automatic. 12" or 15" diameter tables, up to 24 stations.

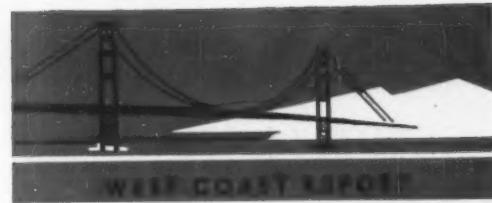
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World's largest  
manufacturer of small punch  
presses and mills.

1835 W. Rosecrans Avenue, Gardena, California

THE IRON AGE



## San Francisco Vows Fewer Product Imports

**Area moves to slash reliance on out-of-state suppliers . . . Local firms asked what products they import which could be made locally . . . Aim is to increase production and attract industry—By R. R. Kay.**

♦ MORE EASTERN FIRMS than ever will be scouting around the San Francisco Bay Area for plant sites in the years ahead if the unique strategy of a group of local business leaders works.

The interest is expected to be the product of a drive to slash the Bay Area's dependence on out-of-state suppliers.

As some executives see it, hundreds of thousands of dollars worth of manufactured products that could be made in the area are imported each year.

**Call to Action . . .** This importing is a sore spot with industrialists. And they have banded together under the auspices of the San Francisco Chamber of Commerce's Manufacturers Committee to do something about it.

The plan of action calls for an exhaustive survey and referral of results that it is hoped will: (1) stimulate increased manufacturing; (2) encourage diversification of products; and (3) lure new plants from the East.

The first move, mailing some 3000 local manufacturers a questionnaire, has already been made. The big question asked: "What are you buying from out of state that can or should be made locally?"

**Fill Those Pipelines . . .** In less than a week, almost 10 pct of the companies queried responded. This information, the Chamber feels, "is the first step in helping local industry meet its own needs and in broadening the region's industrial activity."

Results of the survey, expected

to be in by the first of February, will be tabulated soon after that and furnished to every manufacturer in the Bay Area.

Firms will be urged to start product diversification to fill local needs as well as requirements of other industries throughout California.

"In cases where local production is not feasible," the Chamber notes, "Eastern manufacturers will be encouraged to come in and fill the gap."

**Only the Beginning . . .** According to L. M. Holland, head of the Chamber's industrial department, this survey is only the beginning of one which might "last for years."

Overall program includes plans to tackle the consumer product field and then possibly raw materials, he said.

Bay region industry will be offered information culled from the survey "for first exploitation." Then Eastern manufacturers will be circularized with the idea of

drawing in new plants to fill balance of the requirements.

**Steel Products Short . . .** According to early survey returns a large amount of the product shortage centers around steel and products made from steel.

Columbia-Geneva, Kaiser and Bethlehem are among top concerns helping in the survey.

The project may result in reducing the area's industrial costs and increasing range of distribution.

Many Bay industries say high freight charges on parts and supplies bought out of the state are a burden. These charges, in turn, limit expansion potential.

**A Missed Boat . . .** The experience of General Metals Corp. shows the extent to which local industry may be missing the boat. In producing diesel engines the firm buys more than half of its supplies and parts—gears, valves, springs and forgings—from outside Calif.

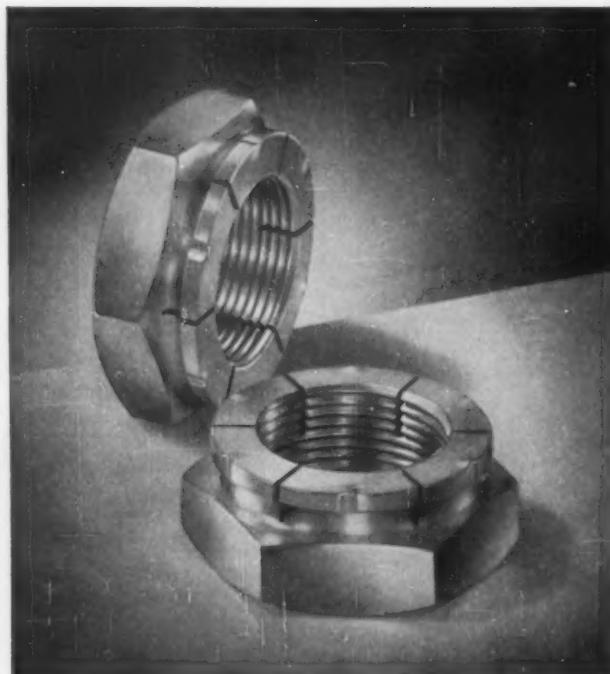
### \$100 Million Gain Seen in Bay Area Expansion

**With San Francisco Bay Area expansions zooming along at a record rate, Chamber of Commerce officials see a possible expansion gain of at least \$100 million in '56.**

**New plants and expansions through the first nine months of the year totaled close to \$352 million, up more than \$93 million over the entire year of 1955.**

**The final tally for this year may be even better if the area gets two new Boeing plants now being considered.**

# Flexloc thin nuts save space, weight and production time



SPECIFICATIONS  
FLEXLOC THIN NUTS



NATIONAL COARSE THREAD—U.S.S.

SIZE	A INCHES	H INCHES	WIDTH ACROSS CORNERS	WEIGHT PER 1000 NUTS
6-32	.312	.125	.361	1.8
8-32	.344	.172	.397	2.8
10-32	.375	.172	.433	3.3
1/4-20	.438	.203	.505	5.4
5/16-18	.563	.250	.649	11.6
3/8-16	.625	.265	.722	14.9
7/16-14	.750	.312	.866	24.9
1/2-13	.813	.312	.938	28.4
9/16-12	.875	.359	1.010	36.1
5/8-11	1.000	.391	1.155	54.1
3/4-10	1.125	.406	1.299	69.2
7/8-9	1.312	.469	1.516	107.5
1-8	1.500	.563	1.732	171.6

NATIONAL FINE THREAD—S.A.E.

SIZE	A INCHES	H INCHES	WIDTH ACROSS CORNERS	WEIGHT PER 1000 NUTS
6-40	.312	.125	.361	1.8
8-36	.344	.172	.397	2.8
10-32	.375	.172	.433	3.3
1/4-28	.438	.203	.505	5.4
5/16-24	.500	.250	.577	8.7
3/8-24	.563	.266	.649	11.5
7/16-20	.625	.312	.722	14.9
1/2-20	.750	.312	.866	21.7
9/16-18	.875	.359	1.010	36.2
5/8-18	.938	.391	1.082	42.4
3/4-16	1.063	.406	1.227	54.5
7/8-14	1.250	.469	1.443	84.6
1-14	1.438	.563	1.660	136.3
1 1/8-12*	1.625	.625	1.876	193.5
1 1/4-12*	1.813	.750	2.093	296.0
1 1/2-12*	2.000	.812	2.309	389.0
1 1/2-12*	2.187	.875	2.526	498.0

\*Steel only (plain or cadmium plated) in stock sizes.

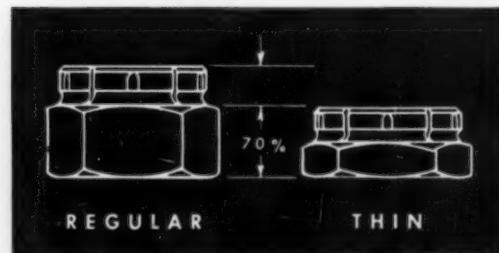
**Self-locking nuts are 30% lower and lighter; speed up assembly with hand or power tools**

Self-locking FLEXLOC thin nuts are 30% lower than regular height locknuts of the same nominal diameter. They fit into spaces where regular height locknuts will not go. You can design lighter, more compact units with them.

Where you must reduce weight in a completed assembly, you can save by using shorter bolts with these lighter nuts. And you save production time. The length of engagement of mating threads is shorter: fewer revolutions of hand wrenches or power nut runners are needed to seat them.

FLEXLOC nuts are of 1-piece, all-metal construction. You can use a FLEXLOC fully seated as a locknut or at any point along a bolt as a stop nut. Once the threads in the resilient locking section are fully engaged, the FLEXLOC grips the mating threads with uniform locking torque wherever wrenching stops. Since there are no nonmetallic inserts to come out or deteriorate, the locking life of a FLEXLOC is virtually unlimited.

Your authorized industrial distributor stocks FLEXLOC nuts in a variety of sizes, materials and finishes. Consult him for details. Or write us for information about your special locknut problem. Flexloc Locknut Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

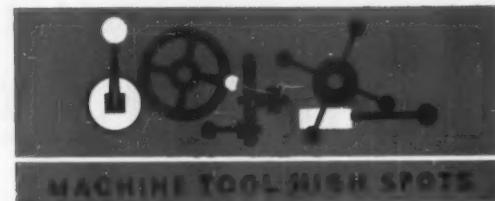


**FLEXLOC thin nuts are 30% lower** than regular height locknuts. There is a corresponding saving in weight. In sizes through  $\frac{5}{16}$  in., thin FLEXLOCs meet tensile strength requirements for regular height locknuts. FLEXLOC nuts can be made in the thin type because every thread, even those in the locking section, carries its full share of the load. There are no nonmetallic inserts to waste head space or weaken the structure of the nut.

Standard FLEXLOC self-locking thin nuts are available in plain or cadmium plated alloy steel, for use in temperatures to 550°F; in plain or silver plated corrosion resisting steel, for temperatures to 750°F; and in brass and aluminum, for temperatures to 250°F.

STANDARD PRESSED STEEL CO.  
**FLEXLOC** LOCKNUT DIVISION **SPS**  
JENKINTOWN, PENNSYLVANIA

THE IRON AGE



## Aircraft Industry Brewing A Revolution

**Need for higher speed means new metals a must . . . Steel alloys, titanium do the job, but are harder to machine . . . Industry wants machine tools based on new concepts—By E. J. Egan, Jr.**

♦ AIRCRAFT industry wants some revolutionary new machine tools. And it wants them now. Without them, says J. H. Famme, Convair's asst. chief engineer, it's going to be tough to even design much needed 1500 and 1600-mpg military planes, to say nothing of building them.

The whole problem stems from the planemakers' switch from aluminum to stronger, more heat-resistant titanium and steel alloys for external aircraft components. Whittling these tough materials into complicated shapes isn't near as easy as machining aluminum.

Mr. Famme put it this way at a recent machining conference: "Aircraft designers now find they are approaching a point where an improvement in design awaits the improvement of machine tools to produce these improved designs."

He calls it a "producibility barrier," lack of definite ways to make certain aircraft parts.

**Try 'Em All . . .** The plane builders are willing to try anything to produce a part to specifications. This means to tolerances that are closer than ever before. New alloys weigh more than aluminum. Every ounce that isn't vital to strength and heat resistance must be eliminated.

This willingness to try new and unconventional machining techniques has led plane builders to investigate: (1) a number of so-called "chipless" production methods, (2) welded fabrication, and (3) "chemical milling."

On "chipless" methods, Mr. Famme said: "It is feared that the plastic forming of materials to

minimize the need for stock removal presents so many problems and complexities that no real solution can be obtained in time."

About welding, the Convair engineer believes: "Weldable alloys are important . . . in the future [belief is] they will be used to a greater extent in making components, rather than the machining of big assemblies."

As for chemical milling, he declared although the process was practically unknown two years ago, "today it is an industry worth millions with a future unlimited."

**Way To Go . . .** But industry hopes for better chipless forming, more weldable alloys, and the bright future of chemical milling aren't going to be fulfilled tomor-

row. For that reason, aircraft firms emphasize what is needed right now is better machinery for doing the same old job—making chips.

Urgency of the situation is indicated by Mr. Famme, "The Air Force and the aircraft industry believe that this machining problem will be a real threat to our national security." As emphasis, he pointed out that it takes almost 3½ years to bring an airplane from the preliminary design stage to actual production.

**Lead Time . . .** He piled another time element on top of this by saying it takes 4 years to bring a new machine tool from the drawing board to the point where an operator is fully qualified to operate it.

But this accumulated lead time isn't the only problem. Despite the harder-to-machine materials in future planes the goal is still to make them close to present production rates and costs.

It seems the traditional pattern of machine tool improvement by slow, evolutionary stages isn't enough for this situation. Plane makers want a whole set of revolutionary new designs.

### Engaged in Gages

Dearborn Gage Co., Dearborn, Mich., has purchased 10 acres in Garden City, Mich.

Company expects to build new facilities including 15,000 sq ft of manufacturing floor space, and 5,000 sq ft of offices.

Construction is expected to be far enough along to permit occupancy by mid-spring 1957.



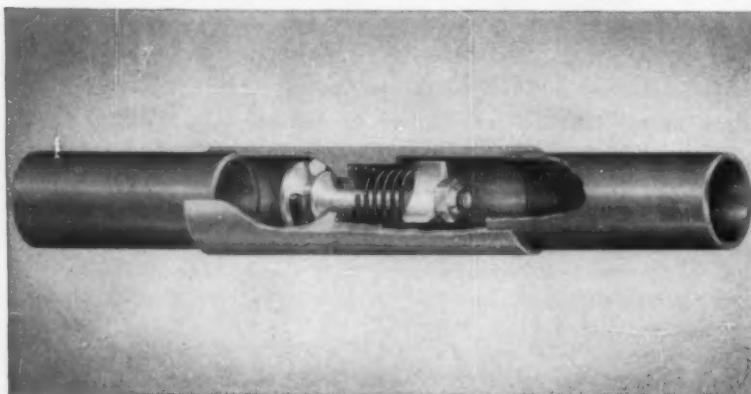
"You should squawk—you're the jerk who smashed the lift truck!"

# BRIDGEPORT BRASS COMPANY

# COPPER ALLOY BULLETIN



Reporting new developments in copper-base alloys and metalworking methods.



Cutaway of Circle Seal Products check valve shows care and precision needed to machine component parts.

## Guaranteed Zero Leakage Check Valve Machined from Free-Cutting Brass Rod

Circle Seal Products Company, Inc., Pasadena, manufactures check, relief and shutoff valves which guarantee positive, leakproof sealing of gas and liquid under all pressure conditions. Used in air conditioner and a variety of other fluid applications, these valves have proved themselves both in the field and in the laboratory.

In their check valve, P13-355, Bridgeport's free-cutting brass rod, Ledrite #6 and copper water tube, Type L Hard Tempered, are used. This valve handles liquid or gas Freon 12 or 22 in the General Electric "Weatherton" heat pump, and positive zero leakage must be constant.

The valve housing (cutaway drawing shown above) containing the poppet "O" ring, spring, spring retainer and nut, is made of Ledrite #6 and requires two screw machining operations. Ledrite #6 was chosen primarily for its easy machinability and fine surface finish. It also provides excellent affinity for furnace brazing to the copper tube ends.

Surface finish of the valve body is doubly important, since the poppet "O" ring is made of a non-resilient material and must seat against a very smooth surface for absolute sealing. Both the poppet and spring seat are of Ledrite; the poppet requiring one machining

operation and the spring seat a milling operation. Ledrite's outstanding machinability to close tolerances, and its ability to hold these tolerances, contribute to the basic sealing and flow resistance principles on which the success of the valve depends. Other factors which govern the choice of this alloy are its corrosion resistance, uniform composition and dimensional accuracy.

Ledrite, since its introduction, continues to serve an impressive variety of screw-machine applications. In many cases, operators have increased spindle speeds by as much as 100%, with a corresponding increase in production. It is exceptionally free-machining, which minimizes tool wear, and finished products are always smooth and clean surfaced.

Bridgeport copper water tubing, Type L Hard Tempered, has found wide application in plumbing, heating, refrigeration and air conditioning. Its economical qualities as well as long service life are two prime reasons for its wide acceptance.

These are but two of the many service-proved Bridgeport alloys that contribute to the success of countless products in a variety of industries. To learn more about how Bridgeport can help you and your product, call your nearest Bridgeport Sales Office.

## Machining for Finish and Accuracy

**Finish** is affected by almost every condition encountered in machining. In many cases the problem is usually solved by higher machine speeds and lower feeds. However, machine-play in the spindle, lack of rigidity in the tool posts and ways, and the type of lubricant affect finish considerably. After these factors have been adjusted, there is the further problem of chip control; the rake and clearance angles of the tool. Too much clearance with large rake angles can be more troublesome than too little of each. Too much clearance and high rake angles cause chattering and hogging by permitting the tool to vibrate—even though minutely. When the front clearance is too small, a burnished or bumpy surface is the result and heat is increased through friction.

**Accuracy**—Probably the greatest single factor governing accuracy (discounting machine error) is chip control. Too much heat caused by friction is another deterrent to accuracy and is, in many cases, equally responsible. If the tool does not cut clean, the resultant increased pressure between the work and the tool forces the work away from the tool, thrusting the carriage back at the same time. When this condition exists, oversize parts are the result.

Undersize dimensions generally are caused by excessive heat. Variations in dimensions are the result of vibration in the machine or tool. Holding accurate sizes requires sharp tools at all times.

## Aid to "Pre-Solving" Machining Problems

Tooling as well as product end use have to be considered when selecting an alloy for a particular purpose. This is not always an easy job. An alloy that can be machined economically on one production set-up may not necessarily perform as well on another.

To avoid these problems, it is advisable to consult your Bridgeport Salesman in making your selection. His advice and experience can help "pre-solve" many problems. (0332)



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Mills at Bridgeport, Conn.  
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## The Iron Age

## SALUTES

**Lawrence Litchfield, Jr.** Vice president of Alcoa and general manager of the Mining Div., he switched from a seagoing career to dry land; became a bauxite mining pioneer. In 30 years, he explored many of the world's mineral sites.

Few would expect a midshipman at the U. S. Naval Academy to spend most of his vocational life with dust blowing in his face instead of salt spray. Yet that is what happened to former Midshipman Lawrence Litchfield, Jr., now vice president of the Aluminum Company of America and general manager of the firm's Mining Div.

Since his graduation from Annapolis in 1920, he has seen more dry land than most sailors have seen of water. He explored countless mineral sites in the U. S., Europe, Mexico, South America, and Africa during the past 30 years. Many a bauxite mining operation has been developed under his direction. The sea's loss was the land's gain.

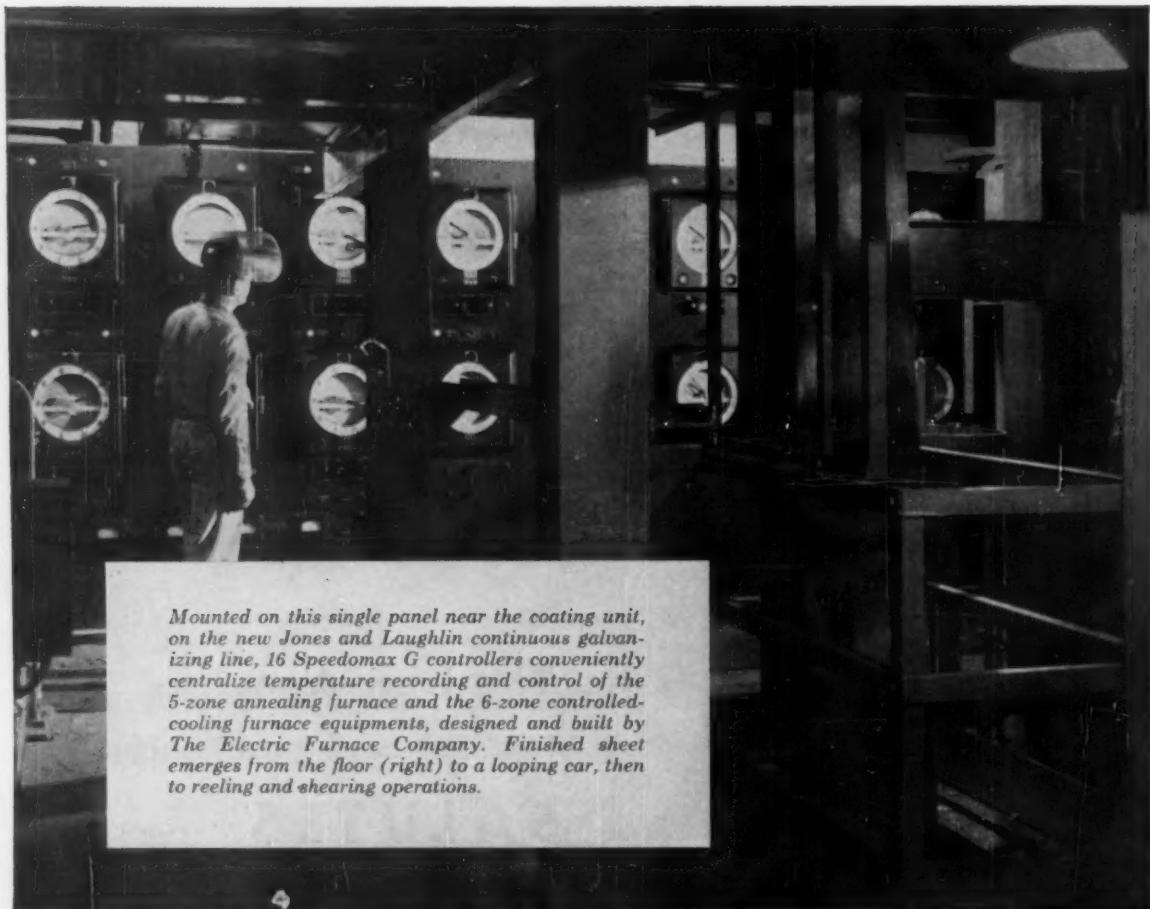
Still, Lawrence Litchfield was no stranger to the sea when he saw fit to plant his roots on the beach. He knew what he was, or wasn't, missing. Born in Pittsburgh in 1900, he received part of his early education in local schools, in Germany,

and Switzerland. A European education involved sea journeys.

At the Naval Academy he was subjected to cruises, too. But after graduating, he enrolled in Harvard University's course in mining engineering and geology. He was graduated magna cum laude in 1923.

Then came a two-year hitch in the U. S. Bureau of Mines, with duty in Pittsburgh, Washington and the Western states. Joining Alcoa in 1925, he was sent to many parts of the world examining mineral properties, searching out new bauxite sources. Justifiably, Lawrence Litchfield may be referred to as a pioneer in bauxite mining.

In 1926, he was named acting managing director of an Alcoa subsidiary in Suriname (Dutch Guiana), South America. He was elected president of Alcoa Mining Co. in 1952 and became vice president of Alcoa in April, 1956. As it turned out, Mr. Litchfield's life has been hardly less adventurous than a life at sea.



Mounted on this single panel near the coating unit, on the new Jones and Laughlin continuous galvanizing line, 16 Speedomax G controllers conveniently centralize temperature recording and control of the 5-zone annealing furnace and the 6-zone controlled-cooling furnace equipments, designed and built by The Electric Furnace Company. Finished sheet emerges from the floor (right) to a looping car, then to reeling and shearing operations.

## 'Round-the-clock Quality Control for a Galvanized Sheet 13 weeks long

**With a maintenance schedule** calling for only 4 shut-downs per year, the new, 610-foot continuous galvanizing line at the Pittsburgh Works of Jones & Laughlin Steel Corporation is geared for 'round-the-clock production at a high rate. Capacity is 7000 to 8000 tons of sheet per month, in an extensive range of widths, gages and coatings—and the booming market for this product demands peak operation.

For such day-in, day-out performance, reliable instrumentation is a "must"—consequently, more than a score of Speedomax recorders and controllers bear a critical responsibility for quality of product.

Sixteen Speedomax G controllers regulate temperature in the controlled-atmosphere annealing and cooling furnaces, for in-line treatment of the sheet prior to coating. Other Speedomax G and

Speedomax H instruments record or control temperature of the sheet itself, the melt, the chemical treating bath, and the ammonia dissociators.

With an increasing trend toward continuous processing, the quality and dependability of L&N instruments become steadily more important to those who want to assure top return from a major plant investment.

If you're planning expansion or modernization, call in an L&N engineer at the early stages—and draw on extensive experience in steel industry instrumentation to guide your thinking. Simply contact our nearest office, or write us at 4956 Stenton Avenue, Philadelphia 44, Pa.

**LEEDS**  **NORTHRUP**  
Instruments Automatic Controls • Furnaces

## PERSONNEL



HARRY REICHERT, elected vice president, Pratt & Whitney Co., Inc., West Hartford, Conn.

## The Iron Age INTRODUCES

**Byron C. Booth**, elected president, The George W. Borg Corp., Delavan, Wis.

**Dennis Boyle**, elected president and treasurer, Vincent Steel Process Co., Detroit; **Charles W. Fritz**, named vice president and general manager; **Thomas H. MacIndoe**, named vice president and sales manager.

**C. M. Apgar**, elected vice president, operations, Adirondack Foundries and Steel Inc., Watervliet, N. Y.; **C. L. Richards**, elected vice president, metallurgy and research; **F. E. Ziter**, elected vice president, engineering.

**S. D. Hackley**, elected vice president, Kaiser Industries Corp., New York.

**F. J. Lloyd, Jr.**, elected vice president, Dravo Corp., Pittsburgh.

**Donald Mac Callum**, named manager, sales, Hill-Chase & Co., Inc.

**Randolph H. Jackson**, named director, sales, Boston Woven Hose & Rubber Co., Boston.

**Arnold R. Jones**, appointed superintendent, mechanical construction and maintenance, Norton Co., Worcester, Mass.

**Bill Murray**, named asst. sales manager, Owatonna Tool Co.

**Edward M. Hanson**, named manager, Baltimore sales office, Clark Controller Co., Cleveland.

**W. K. Krepps**, named asst. to general manager, Spring Div., Crucible Steel Co. of America, Pittsburgh; **Richard C. Lawson**, named sales manager, Spring Div.

**Kenneth G. MacDonald**, appointed product sales manager, furnaces and associated equipment, Industrial Heating Dept., General Electric Co., Shelbyville, Ind.

**Irvine D. Daniels**, named general manager, Receiving Tube Dept., General Electric Co., Owensboro, Ky.

**Gordon R. Snyder**, appointed district sales manager, Pittsburgh, Berger Div., Republic Steel Corp.

**Harry M. Lange**, named southern sales manager, American Cast Iron Pipe Co., Birmingham, Ala.; **Howard Sisson**, named asst. southern sales manager.

**R. W. Thiel**, named superintendent, Birmingham, Ala. plant, American Bridge Div., U. S. Steel Corp.; **R. B. Elliott**, named superintendent, Gary, Ind. plant.

**Ralph M. Thomas**, named asst. general superintendent, rolling mills, Tennessee Coal & Iron Div., U. S. Steel Corp., Bessemer, Ala.



T. S. PACER, elected vice president, Illinois Gear & Machine Co.



E. B. SMILEY, elected vice president, Illinois Gear & Machine Co.



G. P. SULLIVAN, elected vice president, Illinois Gear & Machine Co.

## PERSONNEL

**Roland L. Jandron**, appointed field engineer, Los Angeles district office, Norton Co., Worcester, Mass.

**D. J. LaBelle**, named truck engineer, GMC Truck & Coach Div., General Motors, Pontiac, Mich.

**John W. Stribling**, named consultant, mechanical engineering, Engineering and Maintenance Service Plant, General Electric Co., Schenectady, N. Y.

Following appointments are within the Metallurgical Dept. of Pittsburgh Steel Co. **Byron K. Elder**, named chief metallurgical engineer, service, Detroit; **Russell M. Kotys**, named metallurgist, Sheet Div., Allenport.

**Ray E. Lewin**, named purchasing agent, tractor products, Allis-Chalmers West Allis Works, Purchasing Dept., Milwaukee; **J. J. Bohler**, named buyer, tractor products; **R. J. Kern**, named asst. purchasing agent, mechanical equipment and supplies.

**Howard H. Shakely**, appointed plants engineer, Jones & Laughlin Steel Corp.; **P. H. Reynolds, Jr.**, named contract engineer; **John G. Blissell**, appointed specification and control engineer.

**Brooke K. Williams**, named sales representative, Detroit sales office, Berger Div., Republic Steel Corp.; **Tom R. Rogers**, named sales representative, New York City.

**S. M. Baltzly, Jr.**, named purchasing agent, Chrysler Div., Chrysler Corp., Detroit.

**C. A. Johnson**, appointed sales representative, Detroit, Wolverine Tube, Div. of Calumet & Hecla, Inc., Detroit.

**Robert G. Chown**, named sales engineer, The Teglen Engineering Co., Inc.

**Frederick E. Dator**, appointed manager, finance, Medium Steam Turbine Generator and Gear Dept., General Electric Co.

**Frederick M. Rutledge**, named manager, project engineering, The Hays Corp., Michigan City, Ind.

**Hapgood Kipp**, named Philadelphia district manager, Simplex Valve & Meter Co.

**Russell P. Wynings**, named manager, sales, Gulf States Tube Corp., Rosenberg, Texas; **James E. Wiseman**, named plant superintendent.

**Arthur C. Rae**, appointed director, sales, Atlas Steels Limited, Welland, Ontario.

**Walter K. Palmer**, named manager, Fleetwings Div., Kaiser Metal Products, Inc., Bristol, Pa.

**Herbert W. Fichtner**, appointed sales manager, Atrax Co., Newington, Conn.

**Charles Liechti**, appointed chief engineer, technical services, Eutectic Welding Alloys Corp., Flushing, N. Y.

**Vincent E. Bowes**, appointed petroleum service manager, Kelite Corp., Berkeley Heights, N. J.

**Theodore L. Kishbaugh**, named asst. vice president, Procurement Dept., Joseph T. Ryerson & Son, Inc., Chicago; **Wayne D. Dukette**, named general manager, Los Angeles plant.

**Jack H. Hopper**, named manager, application engineering, East Central District, Apparatus Sales Div., General Electric Co., Cleveland.



**BYRON H. BROWN**, named asst. district sales manager, Cincinnati district sales office, Republic Steel Corp.



**MAX C. FARMER**, named technical director, The Beryllium Corp., Reading, Pa.



**C. J. DUBY**, named chief engineer, International Projects Div., Republic Steel Corp.



**M. H. WARLOW**, named asst. chief engineer, International Projects Div., Republic Steel Corp.

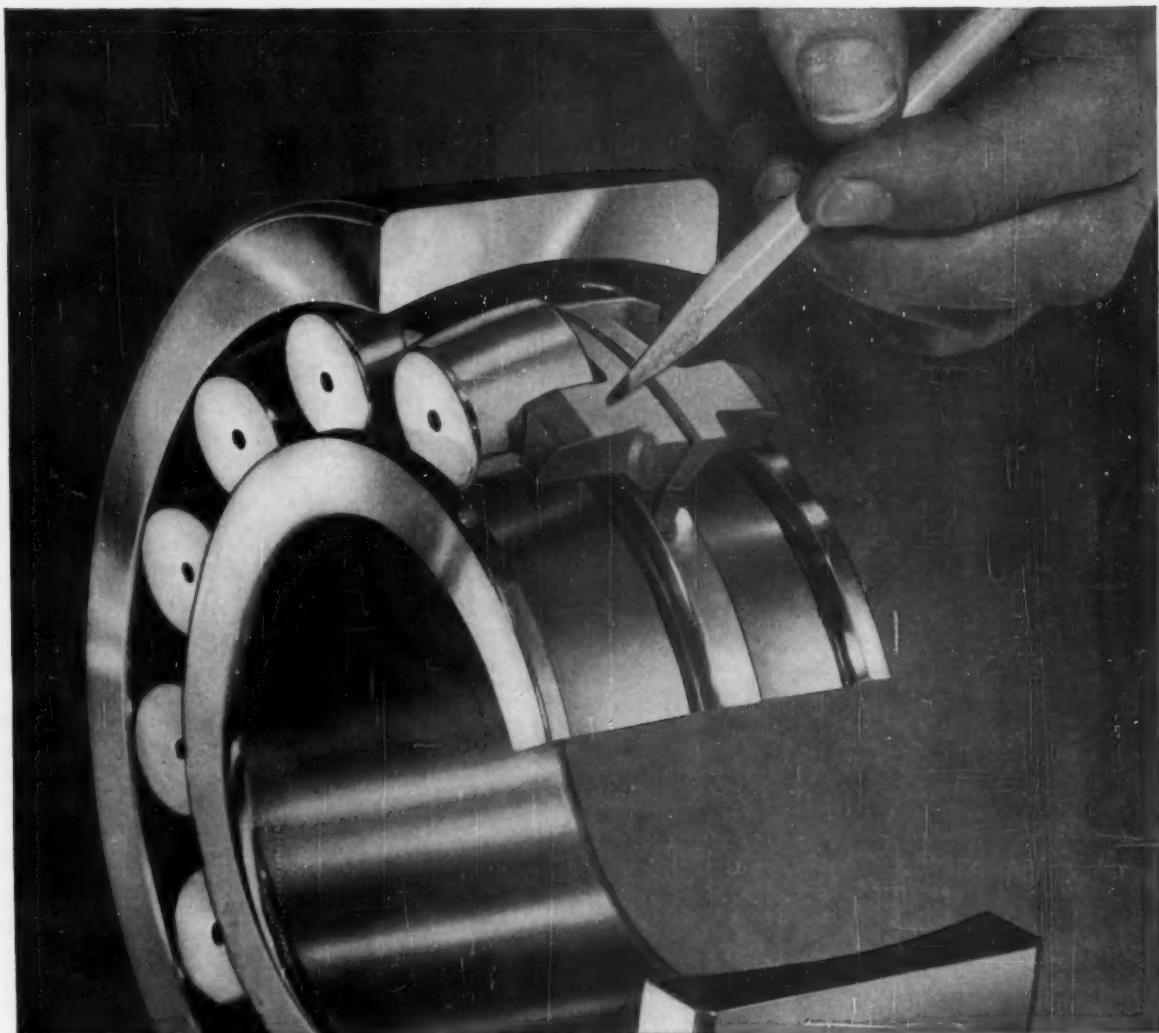
## OBITUARIES

**William P. Woodside**, 79, retired chairman of Park Chemical Co., Detroit.

**Richard Kurtz**, 36, vice president, purchasing, Peninsular Steel Co.

**C. F. Ramseyer**, chairman of the board, Ramseyer & Miller, Inc., New York.

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**Jones & Laughlin**  
STEEL CORPORATION - PITTSBURGH



# How To Simplify Engineering Drawings

By A. H. RAU, Drafting Consultant, General Electric Co., Schenectady

♦ It has been only recently that engineering drawings started to take on a new look — a more practical one . . . No matter how well done a drawing might be, it fails its purpose unless it's simple, concise and instructive.

♦ Take out complexity where you don't need it . . . Standardize engineering forms wherever possible . . . Ask yourself, too, if changes are necessary . . . It's these points, plus many others, which will save you time and money.

♦ MANY FIRMS are so engrossed with product design and development that they tend to overlook their lagging drafting practices. While they contribute greatly to the design and manufacture of thousands of products, drafting techniques, until recently, have undergone little change.

Not long ago, several of General Electric Co.'s departments studied their drafting and drawing reproduction practices. This led to a number of significant improvements in drafting methods

and materials. Where these new developments were applied, output increased and efficiency improved measurably.

A draftsman too often treats the mechanical drawing with its many sectioned views as a work of art, or as an end product. Whether a view is needed or not, he considers it sacrilege not to show every hidden surface. Some drawings are so beautifully and accurately executed, they fail in their intended purpose.

A drawing is an instruction. Therefore, to have value, it must be simple, concise, accurate and immediately understandable. There can be no compromise with this fundamental concept. It must have enough lines to convey what was in the mind of its creator—no more, no less. Less makes the drawing worthless. More wastes time as well as money.

The time element in industrial drafting compels the adoption of a new yardstick to measure drafting values. Drafting stripped of its frills, yet surrendering nothing in either clarity or accuracy, is the new standard.

Many firms have made progress in that direction. However, there's a pile of money to be saved by those firms that are willing to re-

view their drafting objectively, and broadminded enough to abandon some old prejudices.

The draftsman is a vital link between engineering and manufacturing. As such, he has considerable license in spending the company's money when he prepares drawings and specifies materials and labor. On the other hand, he's in an ideal spot to save on material costs and drafting expense. Since the direct and simple way to convey information and issue instructions is always the best, he must recognize what is necessary and what is not.

## No place for art

Planning, production and manufacturing and construction people are not interested in beautifully executed, time-consuming layouts and orthographic projections. What they want is complete, concise, accurate information — and on time.

The way to transfer information from engineers and draftsmen should be the simplest and clearest. If it's possible to convey the information by words alone, then you don't need supporting delineation.

Complex parts can be described



BOTH drawings tell the same story, but the smaller, simpler one covers 4 sq ft and took 2 days to make while larger one took 8 days and requires 57 sq ft.

more economically with illustrations than with words. For such parts, a drawing serves as a framework to support dimensions and other information. Explanations can, complement illustrations, make extra views unneeded.

A drawing with superfluous lines and information not only takes too much time to prepare, but also takes additional time to interpret by each person using it.

There are no hard and fast rules to simplify delineation and eliminate the unnecessary details. But it can be applied in a practical way. Even when the drawings are simple to begin with, the same principles apply to larger and more complex drawings.

#### **Emphasis on creative thinking**

The really important part of any engineer's or draftsman's job is to think. The picture making part of drafting is the least important. The less time he spends on drawing the more time he has for his major job of creative thinking.

Standardization of engineering forms and procedures is another fertile field for big savings in time and money. They practically dictate the way work is laid out. By their very design, they often determine how work flows through engineering into production and manufacturing operations. Hence,

## **Other Ways To Trim Engineering Costs**

### **1. SIMPLIFY DRAWINGS**

It'll save you from 30 to 50 pct of the time previously required. Eliminate non-essentials as well as elaborate and pictorial delineation. Use symbols, freehand drawing, machines for lettering and many other drafting short cuts wherever possible.

### **2. USE PEOPLE AT THEIR HIGHEST SKILL**

Determine the amount of detail work being done by designers. Take steps to segregate design and detail work.

### **3. CONSERVE THE DRAFTSMAN'S TIME**

Put draftsmen on full time jobs for which they are trained. Avoid giving them routine work which qualified clerical personnel can do.

### **4. KEEP A JOB CONTROL RECORD OF WORK LOAD AND PERFORMANCE**

A simple system of work load, planning and scheduling by supervisors assures efficiency and best use of manpower.

### **5. COORDINATED PREPLANNING OF DRAWINGS**

Closer cooperation among methods, production, cost and manufacturing groups while designs are in the layout stages cuts down costly delays and reworking.

### **6. EXAMINE AND EXPAND DESIGN DATA**

Complete design data and good standards promote uniformity in design of like parts and preparation of drawings. It also permits you to use people with less training.

### **7. ESTABLISH A LIBRARY OF STANDARD PARTS**

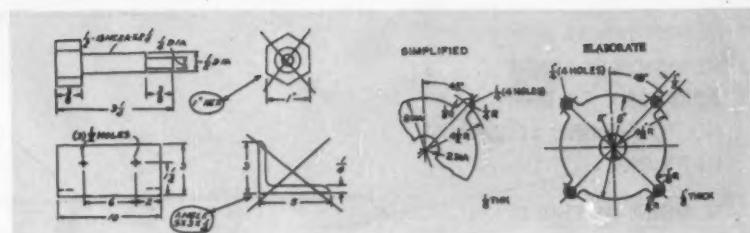
proper design and flow of these forms through the areas of operations definitely results in large savings. Elimination of duplicate or overlapping forms does likewise.

Engineers usually leave the details of setting up drawings to draftsmen. Consequently, draftsmen should plan their work so it meets the needs of all who will use the drawings.

Very often, bills of material, parts lists and drawings are set up for engineering and drafting convenience, rather than for factory requirements. This handicaps those in manufacturing, not only in interpreting the drawings, but also because they must rearrange and rewrite information to meet their needs. Coordinated preplanning of drawings by drafting and manufacturing can save time and money in both groups.

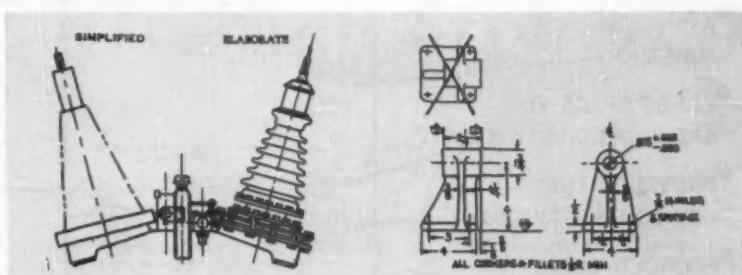
A study made by GE showed that of the 262 different forms for compiling material and parts lists, most were slight modifications of about 62 standard forms. Further study made in the light of operating needs showed that the number could be cut to 12.

The next step involved a study of form design and use to eliminate recopying from original information for planning, production, manufacturing and cost operations. This required a complete

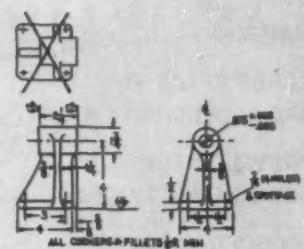


ELIMINATE views which you can describe, such as this hex nut.

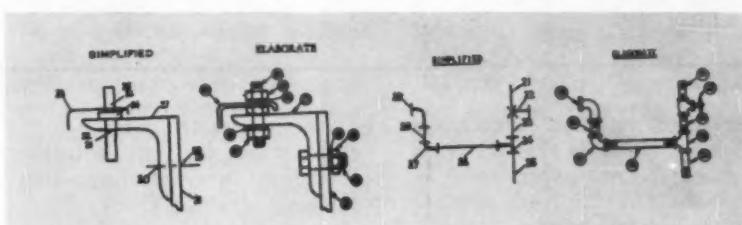
SHOW only partial views of symmetrical parts. It saves time.



AVOID elaborate or pictorial details. It's costly and confusing.



VIEWS without dimensions or instructions often can be omitted.



CIRCLES and arrows lead to complexity. Try to avoid them.

USE simple delineation for common objects. It serves equally well.

An efficient, well-indexed reference library helps engineers and designers to quickly locate existing drawings for any part which may be used on new designs.

#### 8. USE PHOTOGRAPHY IN DRAFTING

Part of the growing trend in drafting is the use of photography for producing electrical and mechanical drawings. Many new techniques conserve drafting manpower. You can use them for re-tracing, preparing complete wiring diagrams, to conserve layouts, and to microfilm reference files.

#### 9. ABBREVIATIONS REDUCE LETTERING

Use abbreviations for commonly

used words and phrases. It results in big savings in drafting as well as among those groups using the drawings.

#### 10. GET PREPRINTED ENGINEERING FORMS

They're economical particularly where information must be repeated. They might include partial drawings or bills of materials which may be completed by a minimum of drafting.

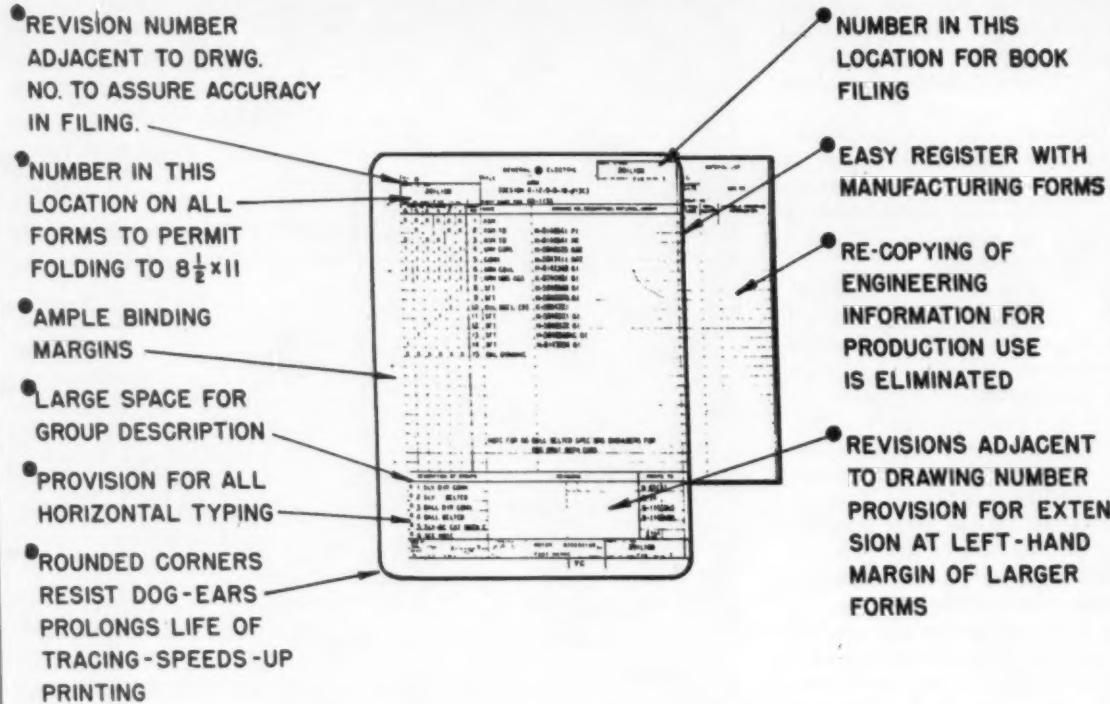
#### 11. AN AID TO FREE-HAND DRAWING

A non-actinic blue grid, preferably  $1/8$ -in. spacing, imprinted over the drawing area facilitates good free-hand drawing. It aids in lay-

out work, often eliminating the need for a scale.

#### 12. OTHER MECHANICAL AIDS

Mechanical aids simplify drafting, reduce physical and mental effort. The more repetitive the work, the more you need them. They include items as modern drafting machines, mechanical pencils, electric calculating machines, electric typewriters for parts lists, plastic cutout templets, electrical erasers, cellulose acetate appliques, self-adhering layout tapes and many others. In fact, use mechanical aids wherever they can save or reduce mental or physical effort.



redesign of standard forms along functional lines so that all types of manufacturing papers could be produced directly from original engineering information by existing reproduction processes.

The redesign involves three basic forms: (1) A mono-part (detail) drawing, (2) a parts list and (3) a combination parts list and drawing. The format of these forms is carried out in the six standard sizes from 8 1/2 in. x 11 in. to 34 in. x 44 in.

#### Forms cut down rewriting

The principal objective of the new forms was to produce all types of manufacturing papers from engineering documents without the need of rewriting. Whenever engineering information is copied, there's the extra chance of error. There's also the problem of keeping the production master synchronized and up-to-date with changes in the original drawing or parts list. Consequently, the system developed is a type of "one writing method" which permits the reproduction of various multiple-use forms directly from the

engineering master parts list.

What about that one controllable expense in every engineering operation—drafting changes?

Repeated changing of drawings consumes a great amount of time. In addition to engineering and drafting personnel, production, manufacturing, cost wage rate and file clerks all along the line are affected.

At GE, a review board scrutinizes all proposed changes on several operations, to reduce interference with production, provide a control over costs, and cut down on the number of changes. The Supervisor of Drafting usually acts as the chairman of the board. All requests for changes, from many sources, come to his desk. Only those necessary to (a) maintain quality or (b) to meet customers' requirements, are released immediately.

Other changes are logged and grouped for periodic review. The review board consists of members from engineering and drafting, production, cost and manufacturing. After considering the proposed changes, (1) some are released to drafting immediately,

(2) others are grouped and logged for periodical change at pre-determined dates, (3) many can be deferred until more important changes have to be made or taken care of in other ways, and (4) a number are rejected outright.

In one department, the number of change requests soon dropped from an average of 120 a week to 30. An analysis showed that 35 pct were released to drafting immediately; 10 pct were rejected outright; 25 pct were approved for periodical change; 30 pct were deferred until more important changes had to be made. It meant that this reduced the amount of drafting due to changes to about one-third the former amount.

Carefully scrutinizing proposed changes (1) reduces the number, (2) prevents change requests without careful analysis, (3) saves the cost of too-frequent minor changes and, (4) practically eliminates having changes made, then rescinded.

*Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.*

# Flash Weld Titanium To High Strengths

♦ IN FABRICATING structures from the higher strength titanium alloys, flash welding offers an outstanding joining method for the production line. Mechanical properties of those welded joints are reported to approach or equal those of the parent metal.

Certain alpha-beta titanium alloys can be solution heat treated and aged after flash welding to tensile strengths of 175,000 psi. The 4Al-4Mn alloy exemplifies this. Others, such as 6Al-4V titanium alloy, heat treat to even higher strength levels in sections less than 1 in. thick.

Work at A. O. Smith, Milwaukee, continues in an effort to develop reliable production criteria covering flash welding of titanium and its alloys. Already this background has paid off by solving problems in production of various titanium components, such as machined forgings. To cite one case, it enabled flash weld fabrication of solid propeller blades involving weld areas of 38½ sq in.

The firm's experience on various equipment over wide ranges of upset and clamping pressures, feed times, voltages and amperages indicates that titanium and steel may be flash welded in similar fashion. (See THE IRON AGE, October 18, 1956, p. 135.) Exceptions to this generalization exist, some of which are pointed out here.

Low and intermediate upset pressures give the best mechanical properties in flash welding titanium.

Higher upset pressures produce directional properties in the weld zone. With such pressures, both bend ductility and the fatigue endurance limit decrease.

A relatively coarse-grained flash welded zone will display excellent ductility. One in which upsetting action has expelled all coarse-grained metal shows a loss in ductility and endurance limit. This occurs even though tensile strength is normal. Such a substandard specimen exhibits distinct fine-grained, out-bent flow lines.

Design of joints for flash welding titanium is generally similar to those used for steel. However, the flash weld metal allowance differs somewhat, as shown in Fig. 1

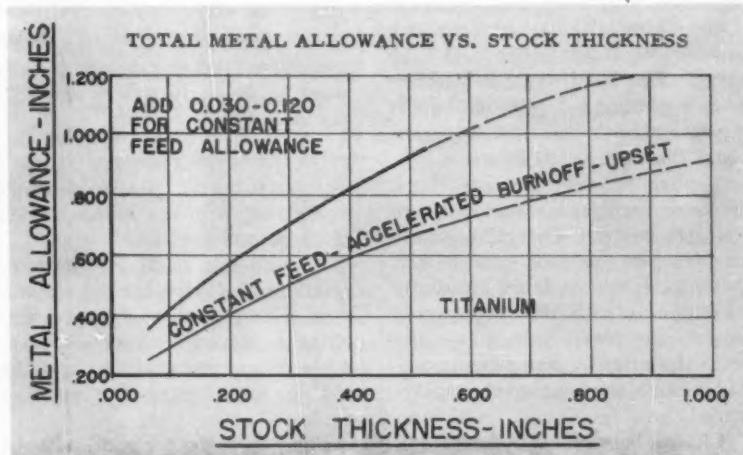
Equivalent clamping pressures apply in flash welding both titanium and steel. But the setup between

parts and inserts must be accurate to prevent arc burning of the titanium due to high contact resistance.

Feed curves for both steel and titanium flash welds are similar. But with titanium, the total accelerated feed time is shorter.

It takes lower voltage to flash weld titanium than steel requires. At A. O. Smith, titanium is flash welded on four machines, with individual capacities of 500, 1000, 1500, and 2500 kva. The largest machine will flash weld about 50 sq in. in steel, and more in titanium.

A recording oscillograph monitors titanium flash-welds on the production line. Use of this technique plus dye penetrant and radiographic inspection makes it possible to eliminate proof testing of flash weldments.



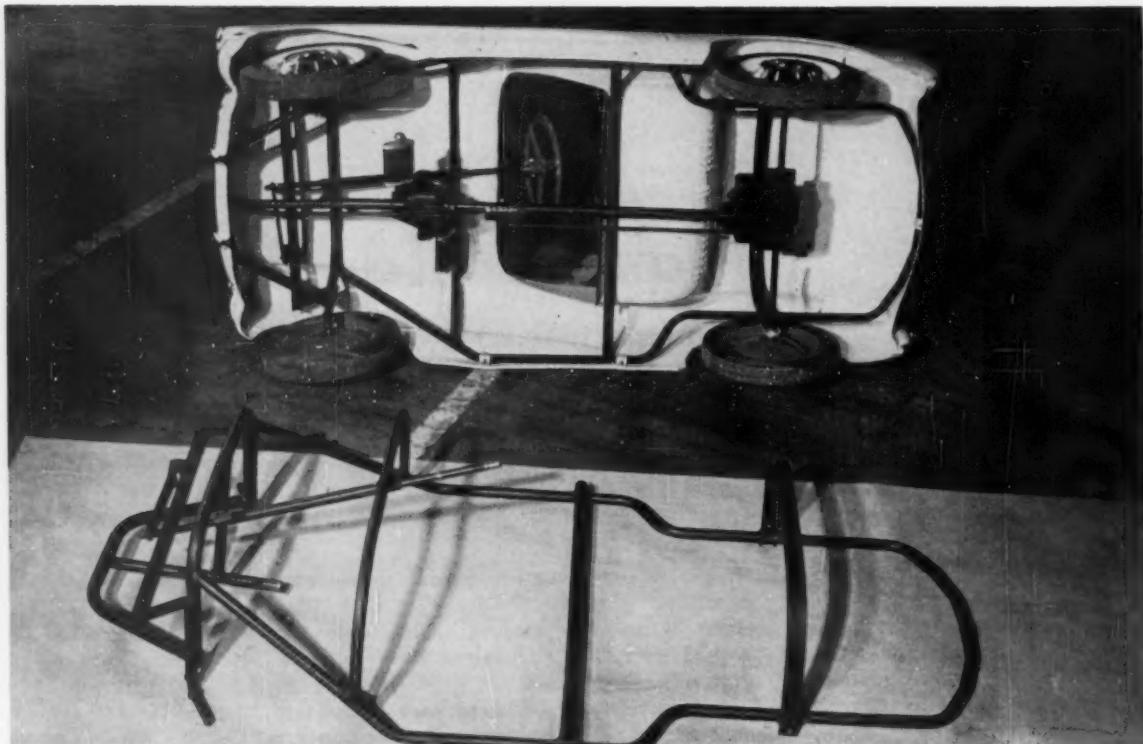


FIG. 1—Side frame members each call for six bends in several bend planes. Net output is 140 parts hourly, or 840 bends.

**840 bends hourly—**

## Draw Bending Keeps Output Up, Costs Down

By S. L. SANTILLO, Plant Superintendent, Flexsteel Spring Div., Northome Furniture Industries, Dubuque, Iowa

• AUTOMATIC DRAW BENDING—in which the center forging tool rotates with the bending arm—produces accurate bends at high speed. The bend angle is controllable within  $\pm 1/2^\circ$ . On automatic equipment, it's possible to make more than 800 bends hourly.

Bends on tubing, extrusions, angular sections or barstock are smooth, without distortion or excessive wrinkling. Draw-bent parts assemble easily and quickly with little fitup, again due to the close control possible with the process. The smooth contours also improve part appearance.

Choice between automatic and

♦ In bending tubing, extrusions, angular sections, barstock and allied workpieces, automatic draw bending can keep production up and costs down . . . Bends are smooth and without distortion.

non-automatic draw bending equipment depends somewhat on the type and variety of work.

In bending a number of parts to small radii (twice the tube diameter or less), you will need a machine equipped with inside mandrels. These mandrels support the tubing wall during the bending cycle.

Bending on larger radii without

♦ Regardless of the number of bends per part, it's possible to make 700 or more bends per hour on automatic equipment . . . Bending angle is controlled within  $\pm 1/2^\circ$  . . . Little fitup is needed in assembly.

mandrels means use of automatic equipment. This is paramount for economy in production costs. Equipment designed with an automatic cycle will enable higher operating speeds, and higher output. The bending arm moves automatically through its entire cycle, both bend and return.

The value of the automatic cycle is best shown by example.

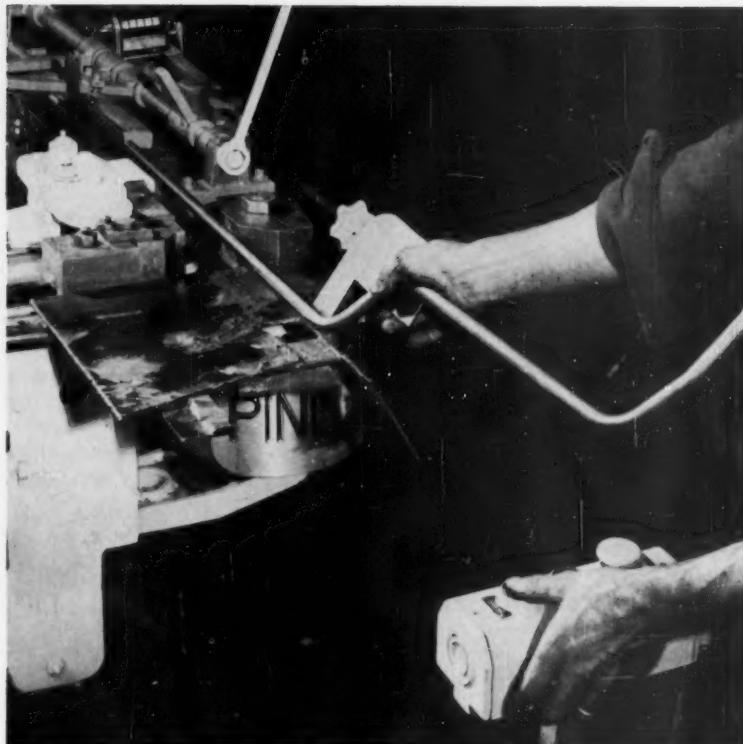


FIG. 2—Note workpiece position against locating plate in the last bend of six, which completes cold forming of a frame member for a toy car.

Consider one high production bending job involving six bends with five bend angles and several bend planes. On this outside contract job, production records over a three-month period show a net output of 140 fully bent parts hourly. This works out to a total of 840 bends every hour.

Stock of this job is  $\frac{5}{8}$  in. OD, 18-gage welded steel tubing. After bending, the tubing becomes a left or a right-hand frame member in a scaled-down model of a Corvette car for children (Fig. 1).

Bending radius on the six bends is  $1\frac{13}{16}$  in., more than twice the tube diameter. So no mandrels are needed.

After loading work into the bender, the operator need only press the "Start" button. Work is automatically clamped and bent to the predetermined angle. After this, the bending arm returns to starting position without operator attention. Bending equipment is



FIG. 3—Center forming tool rotates with bending arm in cold forming one of four parts for a lawn mower handle.

supplied by Pines Engineering Co., Inc., Aurora, Ill.

In forming a frame member, the tube bends first at  $18^\circ$ , then at  $14^\circ$ , at  $58^\circ$ , twice at  $60^\circ$ , and finally at  $29^\circ$ . To produce the proper bend in sequence, the machine automatically resets its bend angles as the operation pro-

gresses through bend stages.

Despite the fact that right and left-hand frame members differ from one another, both are turned out on the same bending setup. This is possible because one workpiece is the mirror image of the other.

To clarify this, examine Fig. 2. It shows the sixth bend in a right-hand frame member. Note the upper slanting plate against which the operator positions the tubing. In bending a left-hand frame member, the part is pushed against the lower slanting plate, seen directly beneath the operator's hand in Fig. 2.

When bending on different planes, the operator positions the end of the piece by gage on brackets arranged on the swinging arm. Spacing of one bend from the next is controlled by holding the workpiece against a consecutive series of stops.

#### Bend 840 times hourly

Despite the different bend angles and varying bend planes, production consistently averages 840 bends per hour.

To achieve high bending rates, generally bends are produced in sequence without turning the workpiece end-for-end. This applies particularly to a large number of bends in a single workpiece. The frame member just described illustrates this.

But the dropoff in bending rate on a piece requiring fewer bends is not as great as you might think.

Production of four-piece lawn mower handles at Flexsteel is an example. Stock for the job is  $\frac{3}{4}$  in. OD, 18-gage welded steel tubing. A second setup on the same Pines bender mentioned earlier permits the operation. Two  $37\frac{1}{2}^\circ$  bends are produced in the workpiece, both on a  $3\frac{3}{8}$  in. bending radius. No mandrels are used. Bend output averages 700 per hour (Fig. 3).

Operator dexterity contributes to the high bending rates described. But the relative simplicity of bending machine operation enables quick and easy training of operators. With little experience, it's possible to attain the efficiency recorded on these two jobs.

Only one setup is normally needed for each workpiece, also helping increase bend output.

**Coating unaffected to 900°F—**

# Aluminized Steel Stands Off Atmospheric Corrosion

By J. C. MERRITT and W. E. McFEE, Armco Steel Corp., Middletown, O.

♦ Most recent entry in the aluminum-coated sheet-steels area, Armco Aluminized Steel Type 2, offers to industry a steel particularly well suited to fight off atmospheric corrosion . . . It has found important markets in construction, other areas.

♦ Here's a report on its properties, comparative costs, and fabricating characteristics . . . It stands up remarkably well in industrial atmospheres . . . Good fabricating properties, attractive cost are added assets.

♦ ALUMINUM-COATED sheet steel is popular for a number of industrial uses. To steel's basic strength has been added aluminum's ability to withstand atmospheric corrosion. At the same time it has good heat resisting and heat reflecting properties.

The first aluminized steel to be made commercially available was Armco's Aluminized Type 1. Latest entry, introduced just last year, is Armco Aluminized Type 2. This is a companion grade offering high atmospheric-corrosion resistance.

Considerable laboratory and field data are now in on Type 2.

Here's how the material shapes up in terms of properties, costs, fabricating characteristics and applications:

Corrosion resistance is excellent. Armco's research engineers have shown that the coating life of Type 2 is at least three times that of commercial weight zinc-coatings in normal or mild industrial atmos-

pheres. They base this claim on atmospheric corrosion investigations covering long periods.

The exposure test now extends over 17 years. In 1939 a sample from the first experimental lot of Type 2 was exposed with galvanized sheet samples in an industrial atmosphere. Today, the aluminum coating on the Type 2 sample is intact with every indication that it will provide base metal protection for years to come.

By contrast, the zinc coating on the galvanized samples is gone and samples are covered with red rust. This condition was observed at the end of 12 years' exposure.

Superiority of Aluminized steel Type 2 over zinc-coated steel is explained by two factors: (1) aluminum's inherently greater corrosion resistance in general atmospheric environments and, (2) aluminum's tendency to become passive in such environments. There is little or no sacrifice of the coating near exposed bare edges. This means there is no progressive deterioration of the coating away from the exposed edges.

Naturally, this latter property means there will be slight rusting at the bare edges, but experience has shown no undercutting of the coating. Corrosion may be seen upon close inspection in its early stages, yet is less discernible as time passes. For example, no edge rust was seen on sheared edges of samples exposed in a mild industrial atmosphere for 17 years.

Surface appearance of Aluminized Type 2 after weathering is

the same as solid aluminum sheet. Samples of both exposed for 6 years in an industrial atmosphere cannot be told apart.

Of marine atmospheres there is not much to say. Testing has not gone far enough to determine anticipated life of Aluminized Type 2. Weight loss tests to date, however, indicate it should outlast commercially galvanized steel.

## Half strength at 900°F

Underwater exposure characteristics are poor. Aluminized Type 2 is not suitable for underwater applications or where the surface stays wet with no periods of alternate drying.

In Heat Resistance, Type 2 compares well. Aluminum alloys begin to lose strength rapidly at 300°F. Only 5 to 20 per cent of their normal strength remains at 700°F. Aluminized Type 2 retains half its normal strength at 900°F. The coating is not affected up to this point.

For temperatures in the 900° to 1250°F range, Aluminized steel Type 1 is recommended. This has an aluminum-silicon alloy coating, as against Type 2's silicon-free aluminum coating.

Comparative mechanical properties of Aluminized Type 2 and aluminum are shown in the accompanying table.

A related property of Aluminized Steel Type 2 is its low coefficient of thermal expansion. This is about  $6.7 \times 10^{-6}$  in. per inch per degree Fahrenheit over the cold-winter to hot-summer range. Aluminum's co-

efficient is almost twice this figure.

Combined with steel's greater strength, the lower coefficient is an obvious advantage where repeated expansion and contraction of weaker materials cause tearing at nail holes.

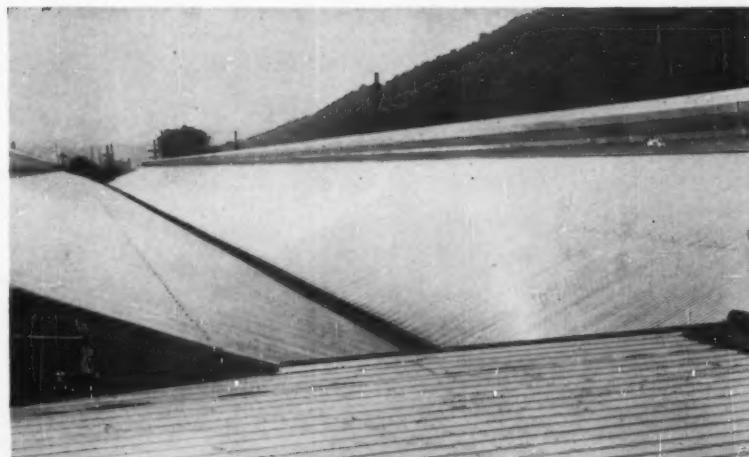
Cost factors are favorable. Thickness for thickness, a cost saving of anywhere from 29 to 45 per cent can be expected when using Aluminized Type 2 instead of aluminum. The variation depends upon the thickness and the aluminum alloy used in the comparison.

Higher strength of Aluminized Type 2 usually permits use of thinner material, which makes for even greater cost savings. These vary from 47 to 62 per cent, depending on thickness and the comparative aluminum alloy.

Initial cost is higher than for galvanized steel, but it's less than the cost of galvanized plus one field coat of paint. Aluminized Type 2 needs no paint protection for long corrosion life.

The material is particularly useful for construction purposes, because of corrosion and fire resistance, high strength and heat reflectivity. Thousands of tons have been used for such applications as building panels, roof deck, prefabricated roofs for silos and wooden storage tanks, grain bins, rolling door sections, and industrial roofing.

It finds many non-constructional applications as well. One large company uses the material on delivery truck skirting directly exposed to corrosive highway chemicals. Other applications are meter and switch boxes, metal awnings,



PITCHED sections of this aluminized steel Type 2 factory roof are corrugated; flat sections are lockseam.

patio covers and carports, industrial fans, highway signs, textile dryers and interior parts of vending machines.

Truck trailer body roofs and structural members, boiler casings, crop dryer outer casings, and outdoor condenser housings for air conditioners are other applications for Type 2.

Fabricating properties are generally good. The material will withstand moderate brake- and roll-forming operations, including Pittsburgh lock-seaming in 20 gage and lighter. It can be spun and embossed but cannot be drawn satisfactorily. It can be cold bent 180 degrees over a diameter equal to twice the metal thickness with no flaking or peeling of the aluminum coating.

In some cases that involve sharp radii, especially with heavier gages,

there may be slight crazing of the coating. Subsequent exposure shows that this may result in a slight discoloration along the bend line. It is not progressive and does not affect the expected service life of the product. Usually it is possible to eliminate bend line crazing by press or die adjustment.

All methods of production welding can be used with Aluminized Steel Type 2. Where applicable, spot, seam and butt flash welding are preferred, since less coating is burned off with these methods.

Painting is not necessary for corrosion resistance. Aluminized steel Type 2 can be painted if desired, though. For this purpose it is supplied either surface-treated and oiled or surface-treated and dry. The mill-applied oil can be removed by any of a number of standard cleaners.

### Comparison of Typical Properties of Type 2 and Aluminum

Table I

	ALUMINIZED Type 2	ALUMINUM					
		3003-H12 (1/4 Hard)	3003-H14 (1/2 Hard)	5052-H32 (1/4 Hard)	5052-H34 (1/2 Hard)	6061-T4 *	6061-T6 **
Tensile Strength, psi	54,000	15,000	17,000	34,000	37,000	35,000	45,000
Yield Strength, psi	40,000	13,000	14,000	26,000	21,000	21,000	40,000
Elongation % in 2"	22	12	9	12	8	22	12

\* Solution heat treated and naturally aged.

\*\* Solution heat treated and artificially aged.

The modulus of elasticity for steel is approximately 29,000,000 psi; for aluminum alloys approximately 10,000,000 psi.

**Fewer roll changes—**

# Hand Rolling, Good Scheduling Boost Mill's Efficiency

◆ Producing short-run stainless items on a bar mill calls for frequent roll changes . . . At the same time, costs must be kept low. This puts a premium on careful planning when a new rolling mill is designed.

◆ This new installation yields top efficiency through a combination of hand-operated and continuous equipment . . . A permanent rolling schedule permits rolling 27 different items with only 5 roll changes.

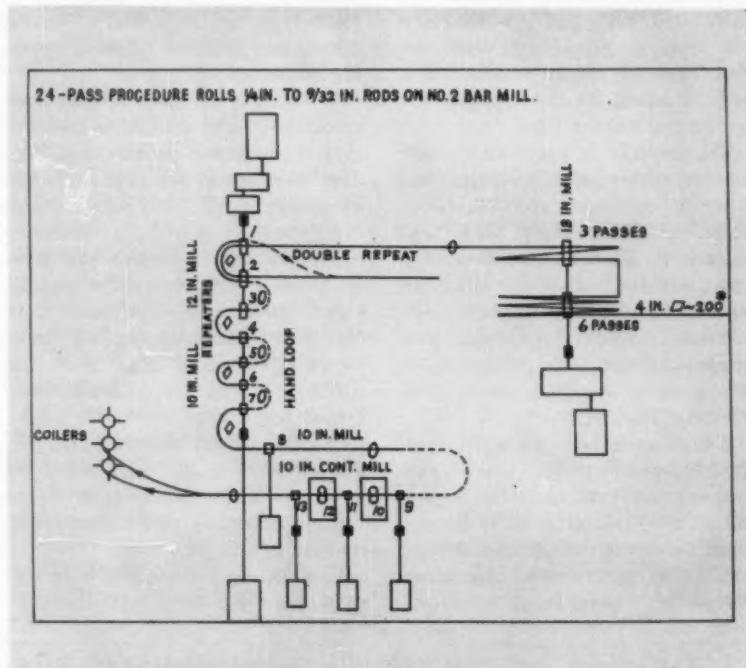
By W. G. PATTON, Engineering Editor

◆ INSTALLING a new rolling mill that is largely hand operated seems like turning back the clock in this automation age. But that's just what Detroit's Rotary Electric Steel Co. did with its new No. 2 mill—in a modern way, of course.

As a result, the firm can turn out an unusually wide variety of short-run stainless steel products with maximum efficiency.

Current production includes stainless steel bars ranging from 0.220-in. to 6-in. squares, as well as rounds, hexagons, wire, flats and angles. This requires facilities and equipment which can be changed fast and very frequently.

Rotary's new mill differs in many important respects from old-style hand mills:



SKETCH of 24-pass procedure for rolling  $1/4$  in. to  $9/32$  in. rods indicates general layout of rolls in new No. 2 mill.

1. Every step of the process—from billet heating to cutoff, cooling or coiling—is completely modern.

2. Careful planning, both in scheduling and in roll and guide design, eliminated the need for many equipment changes that might otherwise have cut deeply into production.

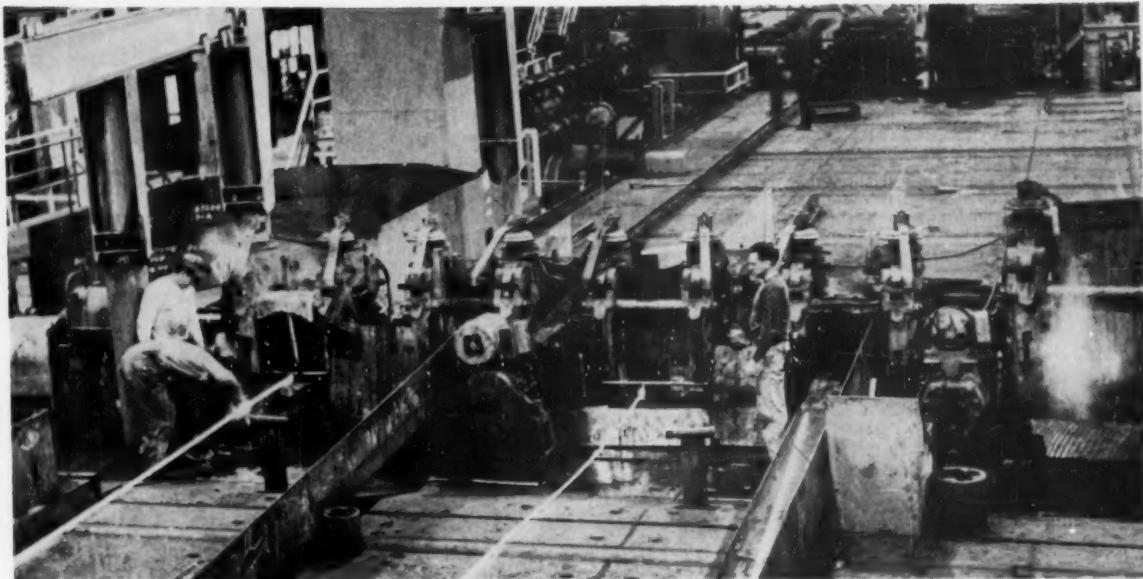
3. Quick changeover of the mill

can be made whenever necessary.

4. Practically all manual lifting has been eliminated by installing the latest mechanical handling equipment.

5. Mechanization is 100 pct in the 6-stand small bar and wire mill where continuous rolling can be used most advantageously.

Planning is the key to what has been accomplished in this instal-



**HANDLING** hot bars of stainless requires a minimum of lifting, driven rolls help push rods through 10-in. and 12-in. mills.

lation. Based on extensive market surveys, a complete rolling schedule cycle was prepared before the new No. 2 mill was laid out. Unless there is a special order, this planned cycle is always followed by the scheduling department.

#### Minimized downtime

Due to constant teamwork between scheduling and production, a minimum of rolling time is lost when rolls have to be changed. Improved service to customers as well as more efficient utilization of the mill are two of the beneficial by-products of this careful planning. The firm claims this scheduling permits production of 27 mill items with only 5 roll changes.

A primary objective of permanent scheduling is to keep stands in the mill as long as possible. Operating experience to date shows that Rotary will probably be able to keep its three 12-in. stands in operation about 70 per cent of the time. Most roll changes will be made in the 10-in. stands.

In its roll designs, the company has avoided, wherever possible, special edging grooves. Forming passes have also been eliminated. In addition, planned overlapping of rolls contributes to overall mill efficiency.

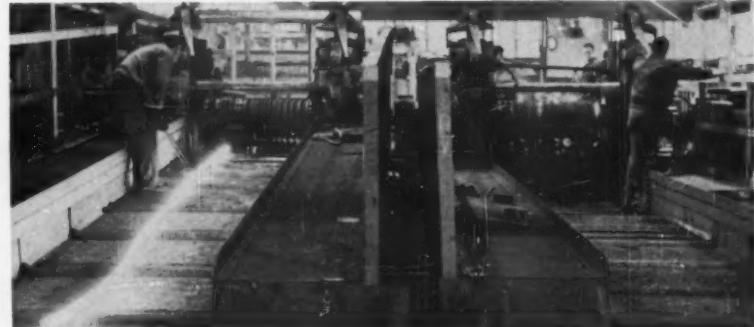
The selection of furnace equipment is directly related to the firm's desire to serve a continually expanding market where only small steel tonnages are required. Batch type, double chamber Olson furnaces having a capacity of 4½ tons per hour per chamber were chosen. There are three of these double-unit, individually fired and controlled furnaces.

Furnaces are charged and discharged through the front door by means of a special manipulator mounted on a Hyster industrial truck. Individual control of furnaces, atmospheres and temperatures makes it possible to achieve excellent quality control of small lot production.

The 18-in. Birdsboro mill equipment includes an entry conveyor from the furnace and a floor roller and drag chains on the furnace side. Two Birdsboro tilt tables on the delivery side have adjustable manipulators. There are two 18-in. three-high stands. Rolling operations are directed from a pulpit.

Plans are to roll all of the products in the No. 2 mill with only two sets of roughing rolls. One set will be used for 4-in. sq billets, handling products ranging from 1¼ to 4-in. sq. The second 18-in. stand is for further reduction. The second set of roughing rolls handles 6-in. sq billets.

Flat sections require recogging. All of this work is also done on



**TWO** tilting tables on the delivery side of the two 18-in. mills help in handling the hot steel bars.

the 18-in. mill. After reconditioning of the billet, rolling is resumed in this mill.

Rolls have been designed so that no change is required in the roughing stands to produce stainless rod products.

The mill's new rolling stands are all in line. Using a drag chain to assist, bars are brought quickly and accurately into position to enter the next stand. There is no necessity to by-pass the end of the mill in order for bars to enter the next stand.

#### Remove unneeded stands

To be more specific, when certain size products are being rolled, the four 10-in. stands need not be used. Similarly, the three 12-in. mill stands need not be in place when 10-in. mill products are being rolled. Thus, under some circumstances, as many as seven stands may be off the shoe plates when finishing is being done on the No. 3 stand of the 12-in. mill.

The 12-in. and 10-in. stands drive from both ends. In case of a motor breakdown, this arrangement permits continued production, in some size groups, while repairs are made or drive motors are changed. Also, driving the 10-in. stands separately permits higher rolling speeds which are desirable from the viewpoint of getting good finish on stainless bar products.

The 12-in. and 10-in. mill includes a 55-ft run-in table and 75 ft of standing equipment with

floor rollers and drag chains on each side of the mill.

Portable lift tables assist in bar handling. Three split and one solid portable repeater are provided for rods and repeating squares. Again, rolling operations are controlled from an operator's pulpit. The 12-in. mill is driven by a 1000-hp motor. A 600-hp motor is used to drive the 10-in. stands.

Stands are mounted on shoe plates which can be moved quickly into place and accurately located with the aid of dowel pins.

Actually, the only time the new bar mill will be completely down for roll changes is when the No. 1 stand of the 18-in. mill requires changing. This efficient arrangement is another benefit of the careful advance planning previously referred to.

Close teamwork between the Scheduling Dept. and the Operating Dept. facilitates buildup of stands in advance of roll changes. When roll changes are necessary, recogging is usually scheduled so that the 18-in. mill continues to produce even though roll changes are being made.

Recogged billets pass the ends of the 12-in. rolls and move on to the cooling beds with minimum amount of interference from roll changes.

As a matter of fact, 12-in. stands No. 1 through No. 3 are used to finish from  $2\frac{1}{2}$  in. up. This product then goes to a 50-ft hot bed where both a hot saw and a cold shear are available.

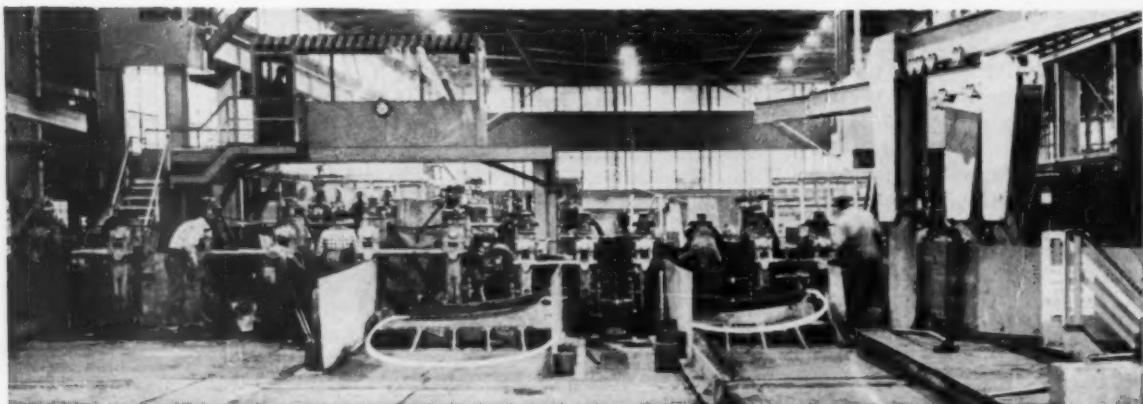
Either six 12-in. stands, or three 12-in. stands with four 10-in. stands, are used in various combinations to finish from  $2\frac{1}{2}$  to  $15/32$  in. on the 120-ft hot bed for cold shearing. Sizes  $15/32$  through  $25/32$  in. can be coiled out of 10-in. stand No. 7. Bars or rods below  $15/32$  in. are finished through the continuous mills to coilers.

The continuous mill equipment includes six Birdsboro stands, all direct driven by 200-hp drives. These stands are alternate horizontal and vertical mills and are fully adjustable. This arrangement permits fast and accurate alignment of the stands and greatly facilitates the production of bar and wire products of uniform cross section.

The continuous rod mill is not used when products over  $7/16$  in. round are being rolled. This permits the roll builders (who are furnished with advance rolling schedules) to tear down and build up mill stands, complete with guides and ready to connect up water lines.

#### Other facilities

Other mill facilities include Victor Browning overhead cranes, necessary coilers, a 120-ft Birdsboro cooling bed and equipment, a 50-ft Birdsboro cooling bed and equipment, scales, motors, controls and substations. In addition to storage space sufficient to meet the essential requirements of the installation, there is a roll shop, equipped with three lathes.

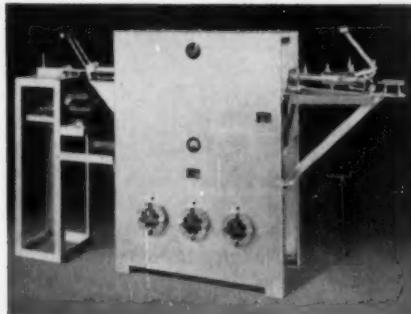


CONTROL of these 10-in. and 12-in. repeater rolls is maintained by the operator from the overhead pulpit seen at left.

# HARPER

## THE COMPLETE LINE OF SINTERING FURNACES

Here Are Six Types of Harper Electric Furnaces Being Used for Powdered Metal Work

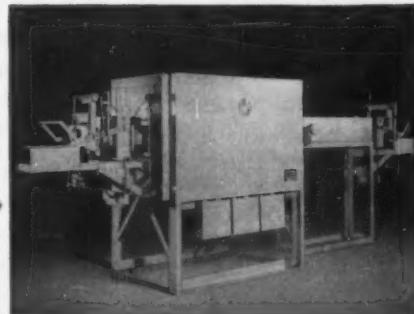


### HIGH TEMPERATURE TUBE FURNACE

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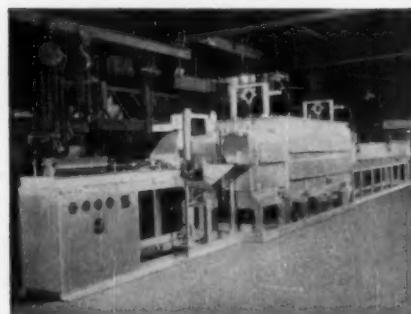
### CONTROLLED ATMOSPHERE BOX FURNACE

Ideal for research, pilot plant, and small production. Temperatures up to 2500°F., with reducing atmospheres. Used with and without muffle. Suitable for batch or straight-through pusher operation, with water-cooled cooling chamber. Wide range of sizes.

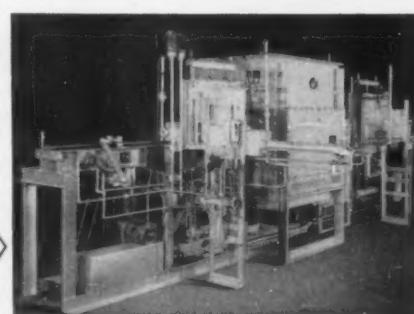


### MECHANICAL OR HYDRAULIC PUSHER FURNACE

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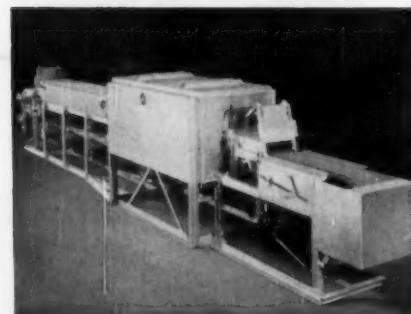


**MOLYBDENUM GRID FURNACE**  
Moly furnaces handle the sintering applications up to 3000°F. Presently in use on carbides, tungsten contact points, heavy metals, and metallizing ceramics. Available as batch or continuous pusher furnace.

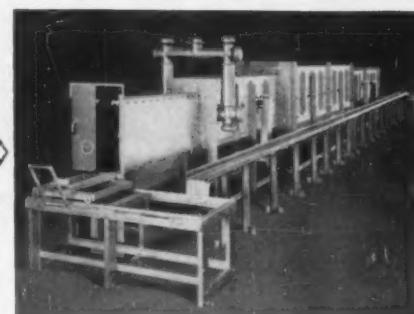


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## INSPECTION: Black Light Checks Big Pipe

Automatic handling speeds magnetic particle inspection of surface defects in large diameter pipe . . . Surface flaws show up under ultraviolet light on fluorescent ferromagnetic particles . . . Once spotted, minor flaws are removed by grinding or cutting

Fully mechanized handling speeds magnetic particle detection of surface defects in large diameter pipe in the plant of a tube manufacturer. A giant inspection unit automatically transports and checks 10½-in. tubing up to 48-in. long.

### Uses Black Light

Spang-Chalfant Div. of National Supply Co., Pittsburgh, recently installed the big testing setup to complement its high pressure tests, another method used. Automatic handling, the firm states, results in considerably increased efficiency and speed of inspection.

Surface flaws are now located

### WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 73. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

by black light on fluorescent ferromagnetic particles. These are sprayed on the pipe in a water suspension. Minor flaws are then removed either by surface grinding or cutting the pipe into shorter lengths.

The full length of 20 to 48-ft pieces of pipe is magnetized, then sprayed with fluorescent magnetic particles suspended in water. They are inspected under part or all of the 34 black lights that are spaced 18 in. apart in the inspection booth.

Automatic handling starts on loading skids where pipes are placed by overhead traveling crane. Gravity rolls pipe to the first stop blocks. The skids have a slope of  $\frac{1}{4}$  in. per foot over most of the table and  $\frac{3}{4}$  in. per foot for about  $3\frac{1}{2}$  ft before the stop blocks.

### Feeler Locates Pipe End

Pick-up arms lift the leading length of pipe onto conveyor rolls. These position it for rolling into the inspection unit by carrying it longitudinally to a fixed stop. The conveyor consists of four conveyor rollers individually powered through chain drives by electric motors. They carry the pipe at a speed of 3 ft per second.

The pipe is then lifted onto a short skid and rolls to a second stop. In this position a "feeler" contact locates the pipe end and

automatically lowers the stops to allow the pipe to roll into position for magnetizing.

Magnetizing is accomplished with 2-ft long, scissors-like contacts; these are inserted into both pipe ends. The pipe is directionally magnetized by 6000-amp maximum of full-wave dc at a maximum of 22 v in such a way as to produce a circular magnetic field in the pipe wall. Any defect in the surface of the pipe except one that is exactly parallel with the magnetic field cuts through the



Roller conveyor supports tube as jacks turn it for inspection.

"magnetic lines of force." This attracts and arranges the magnetic particles into a pattern around the defect made visible by fluorescence of the particles under black light.

## Machining:

Throw-away blanks  
permanently identified.

Maintenance and inventory of cemented tungsten carbide throw-away blanks have posed problems for some tool rooms. While blanks made by many manufacturers, re-

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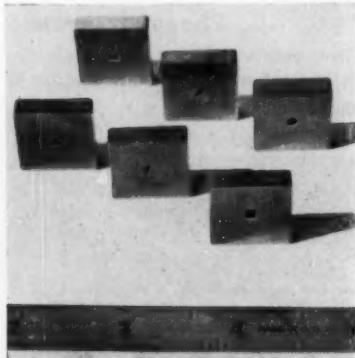
Branch  
3042-3058 W. 51st Street, CHICAGO, ILL.  
Phone: Grovehill 6-2600

gardless of grade, look alike, sometimes they are quite different. Often, this results in the misuse of grades and in high tool costs and excessive scrap.

#### No Problem In Past

In the past on cutting tools, grade identification was no problem since the carbide grade was knurled on the tool's shank. Tools had a single brazed point which stayed with it for life.

Answers to the problem of mixing grades have come in various code forms from several manufacturers. The latest is a designation pressed 1/64 of an inch deep into the face of throw-away blanks.



**Symbols imbedded in center of each blank identifies it.**

Carmet Div. of Allegheny Ludlum Steel Corp. permanently marks their six throw-away grades by this method. This allows fast identification of their tools in the form of triangles, squares and rectangles.

The identification symbols appear as recessed squares, semi-circles, triangles, circles, diamonds and rectangles.

#### Handling:

**Boltmaker trio moves,  
relocates in four days.**

Cleveland Cap Screw Co. systematically transferred operations into its new \$5,000,000 show-place plant five miles southwest of Cleveland. This involved moving three boltmakers; each weighs more than 30-tons. They were uprooted from the old plant to the

new and installed ready for operation within four days.

Easton Cartage, rigging contractors, handled the heavy machinery, two 5 $\frac{1}{2}$ -in. diam cap screw boltmakers and one 1/2-in. machine.

#### Machinery Dismantled

Well planned in advance, the four day move included dismantling the machinery at Cleveland Cap's old plant, moving it half-

way across Cleveland to the new site, and installing the boltmakers ready for operation. On the fourth day, operators fed wire coils into the newly painted equipment and, after a test run, it was pronounced ready for production.

The precision-built equipment, cold forges cap screws extruded to fine tolerance and high strength. Delicate despite their great bulk, the boltmaking units were coddled throughout the move.



#### Install Thomas Flexible Couplings

First cost is only cost when you buy Thomas Flexible Couplings . . . because Thomas Flexible Couplings are correctly engineered, have no wearing parts . . . need no lubrication . . . eliminate future maintenance costs. Even more, Thomas all-metal couplings can be inspected while running—ending inspection shut-downs!

For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last forever.

#### NO LUBRICATION . . . NO MAINTENANCE . . .

There Are No Wearing Parts

Under load and misalignment, only Thomas Flexible Couplings offer all these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Smooth, continuous drive with constant rotational velocity
4. Visual inspection while operating
5. Original balance for life

*Write for Engineering Catalog 51A*



## FREE AIDS

# New Technical Literature:

## Catalogs and Bulletins

### Control valves

High speed, rugged, dependable control valves are illustrated in a six-page folder. It covers both air and hydraulic units. These make automated, interlocking operations more dependable, it states. Numerous advantages and specifications are listed. *C. B. Hunt & Son, Inc.*

For free copy circle No. 1 on postcard, p. 73

### Titanium analysis

How Boeing Airplane Co. uses X-ray diffraction to analyze titanium and other alloys is reviewed in a new bulletin. It describes specimen preparation and results obtained with three X-ray techniques: powder camera, diffrac-

### FOR YOUR COPY

**Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 73.**

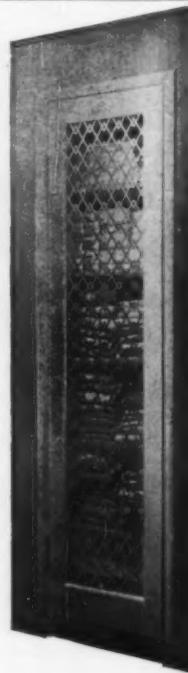
tometer and spectrograph. The bulletin discusses, in addition to titanium, such metals as 17-7PH, 303, 321 and 347 stainless steels, 24S, 75S and 78S aluminum alloys, nickel-chrome salt pot electrodes and lead-in solders. *North American Philips Co., Inc.*

For free copy circle No. 2 on postcard, p. 73

## Hendrick Adds Class to Living Rooms and → Locker Rooms→

More and more designers are including Hendrick Perforated Metal in the fabrication of new products. Typical of these is one company who manufactures the attractive room divider shown above using Hendrick Perforated Metal Square Link design. Another manufacturer installs an attractive Hendrick Ornamental Metal Grille on linen closet and locker doors.

And there are thousands of other applications where Hendrick Perforated Metal has added to product style and functionalism. For information on the type of perforated metal or grille best suited to your needs, call Hendrick today.



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Perforated Metal • Perforated Metal Screens • Wedge-Slot and Hendrick Wedge-Wire Screens • Architectural Grilles • Micco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro Dehazer

### Fasteners

An eight-page consensus of a 144-page catalog contains basic engineering data and specifications on nuts. It describes hexagon nuts sizes  $\frac{1}{4}$  to 3-in., 12 Pointer nuts sizes  $\frac{1}{4}$  to  $\frac{5}{8}$ -in., "Huglock" and "Marsden" locknuts sizes  $\frac{1}{4}$  to  $1\frac{1}{2}$ -in. *National Machine Products Co.* For free copy circle No. 3 on postcard, p. 73

### Phosphor bronze

Ultra-thin gage and extremely high-tolerance phosphor-bronze is the subject matter of a four-page data sheet. This publication contains pertinent data on the physical characteristics, processing, and applications of phosphor-bronze in thicknesses as low as 0.0005-in. ( $\pm 0.0001$ "). *American Silver Co.* For free copy circle No. 4 on postcard, p. 73

### Gear shaving

Gear shaving cutter care and use are dealt with in a dozen page reference manual. It includes: cutter specification tables, mounting instructions and data on speeds, feeds, coolant, cutter life, sharpening, storage, and cutter repair. *National Broach & Machine Co.* For free copy circle No. 5 on postcard, p. 73

### Air compressors

Automotive, industrial and portable air compressors are presented in a 16-page catalog. The booklet sets forth recommendations in selection of an air compressor. *Binks Mfg. Co.* For free copy circle No. 6 on postcard, p. 73

### Steel strapping

Steel strapping and packaging operations can now keep pace with the fastest production lines with a new strapping machine. So states a folder just published by the machine's manufacturer. *Steel Products Div., Acme Steel Co.* For free copy circle No. 7 on postcard, p. 73

### **Stainless fasteners**

Stainless steel fasteners are presented in a new condensed stock list. Thirty seven different basic fastening devices are illustrated in the 8-page brochure. Included are screws, bolts, nuts, washers, rivets, pins, and more. *Allmetal Screw Products Co., Inc.*

For free copy circle No. 8 on postcard, p. 73

### **Temperature control**

Controls that regulate electric range-top cooking temperatures are described in a new bulletin. It provides electric cooking range manufacturers with a general description of the control device. Illustrations of its design and construction, and useful information on its performance are listed. *Robertshaw-Fulton Controls Co.*

For free copy circle No. 9 on postcard, p. 73

### **Flexible couplings**

Torsionally flexible couplings are fully described in a new 24-page catalog. Employing of preloaded rubber biscuits as the flexible medium is explained. Dimensions and specifications are given on standard, double and radial type couplings with additional data on coupling driveshifts. *Morse Chain Co.*

For free copy circle No. 10 on postcard, p. 73

### **Large nuts**

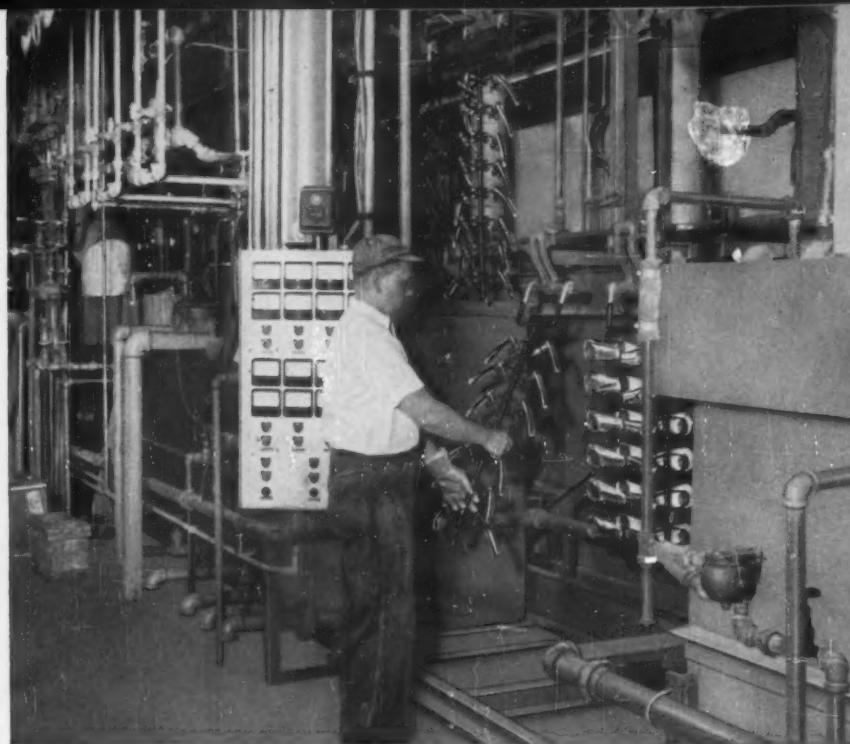
Large nuts are detailed in a bulletin just issued. The large nuts can be furnished from stock in standard and special hexagon dimensions, it relates. Standard nuts can be furnished semi-finished, tapped, Class 2 or better. Bearing surface is washer faced at right angles to thread. *Security Locknut Corp.*

For free copy circle No. 11 on postcard, p. 73

### **Circuit breakers**

A method of co-ordinating molded case circuit breakers with current-limiting fuses for protecting low-voltage feeder circuits against fault currents up to 100,000-amp (RMS asymmetrical) is described in a new bulletin. *Circuit Protective Devices Dept., General Electric Co.*

For free copy circle No. 12 on postcard, p. 73



## **CUT YOUR PLATING TIME WITH THESE UDYLITE PROCESSES**

### **HI-C Processes Give Faster Nickel Plate on Die Cast or Steel Parts**

In plating some 5000 die cast and steel parts per hour, Rival Manufacturing Company of Kansas City, Missouri, use Udylite 514 HI-C and 31 HI-C bright nickel processes in combination with two Udylite Full Automatic Plating Machines.

The HI-C (high chloride) baths give faster bright nickel plate than any processes ever developed and at the same time brighter, more ductile and smoother nickel finishes. They are developments of the Udylite Research Corporation and are the only bright high chloride baths available commercially.

The HI-C processes plate nickel perfectly over copper for die cast parts and provide the important underlay for the final chrome plated finish. They are also used by Rival as the basic coating on steel before the chrome is applied.

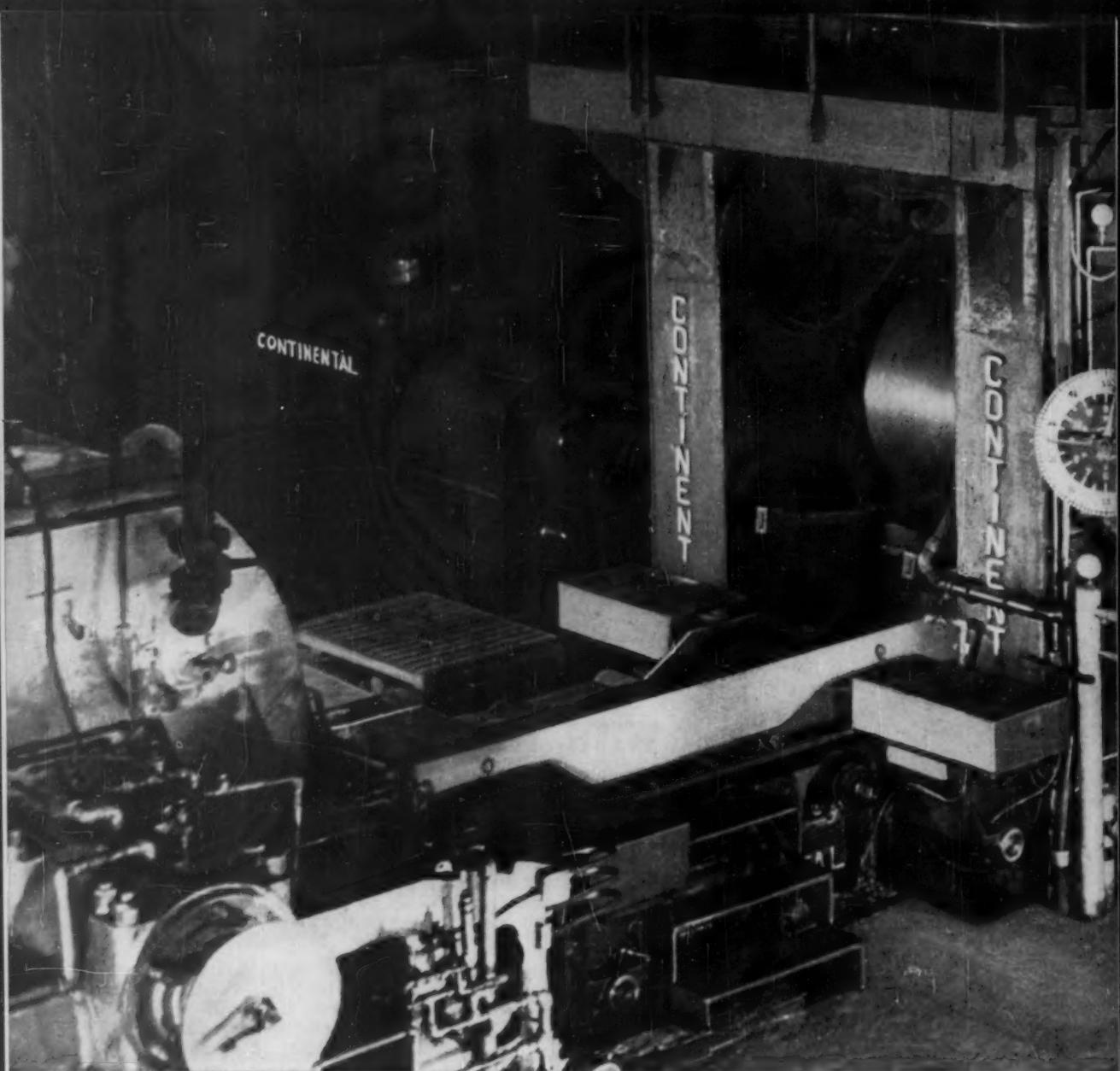
As every electroplater knows, where the cycles of copper, nickel and chrome plating are used, nickel plating is the most time consuming. Therefore, Udylite's development of HI-C for speeding up the nickel cycle is of prime importance.

The use of Udylite Full Automatics by Rival has greatly increased efficiency and economy. Only one man is required to inspect the parts and operate each machine. Now there is complete coordination between fabricating, finishing and assembly. HI-C processes and the controlled time cycle of plating have improved the quality of finish and greatly reduced rejects.

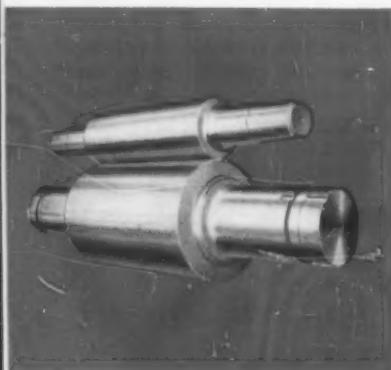
A Udylite HI-C nickel process and a Udylite Automatic Plating Machine will save time, money and improve your product. Let us tell you how. Write us today.



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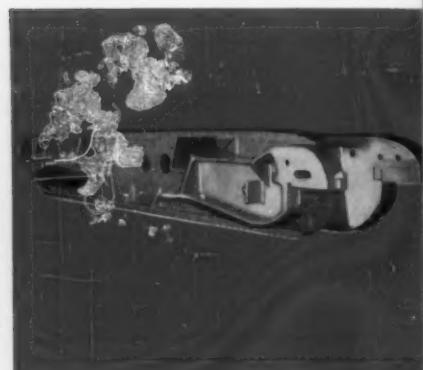
**CONTINENTAL 26" x 49" x 66", 4-high reversing hot strip mill**  
In the Newport Steel Corporation Plant, Newport, Kentucky.



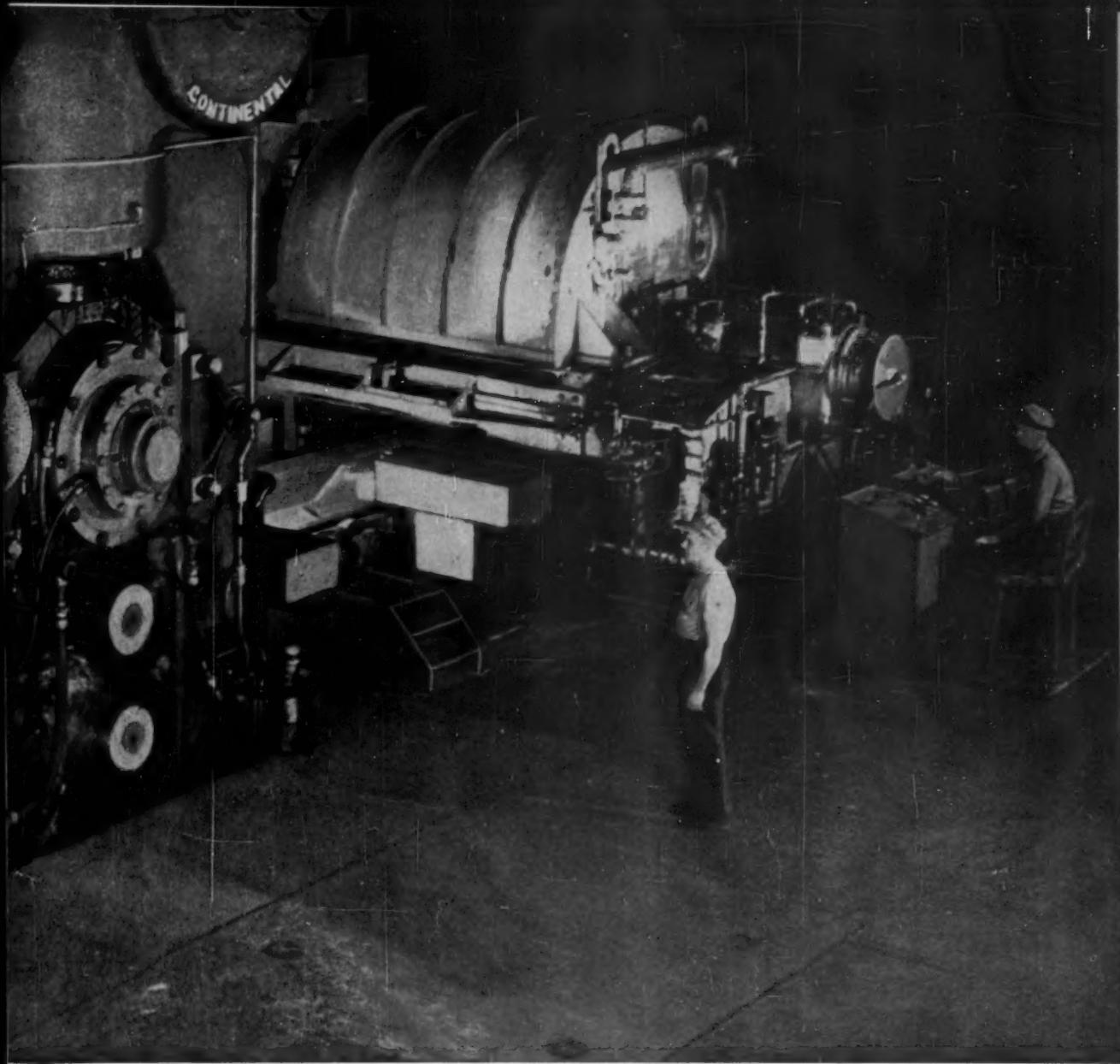
**ROLLS**—iron, alloy iron and steel rolls for all types of rolling mills.



**CASTINGS**—carbon and alloy steel castings from 20 to 250,000 pounds.



**WELDMENTS**—fabricated steel plate, or cast-weld design.



**BLAW-KNOX makes what it takes**  
**to roll precision-gage hot strip directly from ingots**

Precision-gage hot strip is rolled directly from ingots by this modern CONTINENTAL 66-inch 4-high reversing hot strip mill in the Newport Steel Plant at Newport, Kentucky.

A full range of gages and analyses, including carbon and special grades of steel, are rolled by this 26" x 49" x 66" mill. The mill was designed to incorporate an existing 4000 hp. d.c. reversing motor through a pinion stand.

Blaw-Knox designs and builds complete rolling mill installations—assumes un-

divided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

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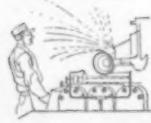
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# FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 68.

## Induction furnaces

Induction melting furnaces and related equipment appear in a new bulletin. It is replete with installation photographs as well as product information on both motor-generator induction melting furnaces and metal melters. Performance tables give melting times of various quantities of molten metal. *Inductotherm Corp.*

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## Beryllium copper

Beryllium copper's use in multi-contact electrical connectors is covered in a technical bulletin. It explains how connectors are manufactured and equipped with a beryllium copper spring. Tight quality control procedures are related. *The Beryllium Corp.*

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## Airborne equipment

Enclosed switches for airborne equipment are detailed in a new 24-page catalog. These switches also can be suitable for use in other type applications. They are available in a wide variety of actuator designs, electrical ratings and contact arrangements. Switches work on ac or dc. *Micro Switch Div., Minneapolis Honeywell Regulator Co.*

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## Spectroscope

Various types of spectrosopes, such as diffraction, prism, reversion and ultra violet, and accessories are described in a new catalog. *The Ealing Corp.*

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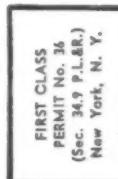
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## Special fasteners

A comprehensive data bulletin illustrates and describes 128 types of special fasteners. Full description is given including size, material, finish and application. Large illustrations show each fastener. *Buffalo Bolt Co.*

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## Steam cleaner

Using natural or manufactured gas, or liquefied petroleum, a steam cleaner heats cleaning solution drawn from any large drum. A specifications sheet now available says the unit has a steam cleaning capacity of 60-gph. It is designed to operate at 80 to 110-psi pressure. *Homestead Valve Mfg. Co.*

For free copy circle No. 20 on postcard

## FREE TECHNICAL LITERATURE

### Flexible tubing

Flexible tubing with flexible uses is introduced in a new folder. It describes the pressure tubing's advantages as: (1) extremely high pressure rating per unit weight, (2) installation flexibility, (3) high flex-vibration fatigue resistance, (4) mechanical strength, (5) touch, crush resistant, (6) corrosion, rust resistant, (7) odorless, tasteless, non-toxic, fungus resistant, (8) can be used with standard fixtures, (9) lightweight (1/9th that of copper), (10) serves over wide temperature range, (11) comparatively low cost. *The Polymer Corp. of Penna.*

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### Vertical shaper

An imported 5-in. ram stroke vertical shaper is described in literature presently obtainable. It handles toolroom work and short production runs of parts requiring machining of regular or irregular internal or external contours in a single set-up. The machine provides 11½-in. longitudinal and transverse carriage movements, plus rotary movement through a built-in 12½-in. rotary table. A 2-hp motor powers the machine-tool. *Austin Industrial Corp.*

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### Engineering data

A 34-page bound booklet indicates how a firm's engineers' broad experience and capability is being used in the performance of major projects. In many successful projects, the work is preceded by a careful study of the related problems. This enables execution of a better planned, hence faster and cheaper project, it states. The booklet comments on the growing scarcity of competent engineering talent. This, it says, is a factor to consider in redesigning facilities. *Kaiser Engineers.*

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### Aluminized steel

Properties and characteristics of aluminized steel type 1 are detailed in an illustrated folder. This special-purpose steel is reported to have resistance to combinations of heat and corrosion; high heat reflectivity; and the surface qualities of aluminum with the strength of steel. *Armco Steel Corp.*

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### Welders

Electric motor driven arc welders, their descriptions and specifications, are illustrated on the first two pages of a new welding booklet. Similar space is devoted to gasoline driven arc welders. Several types are illustrated. Also included are descriptions of "build your own" generators and ac transformers. Accessories, portable mountings and a combination ac power-ac welder are reviewed. A wide variety of types and sizes of dc (rotating, rectifier) and ac (weld-power, transformer) appear. *Hobart Bros. Co.*

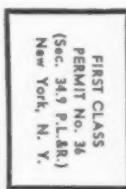
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### Reactor trio

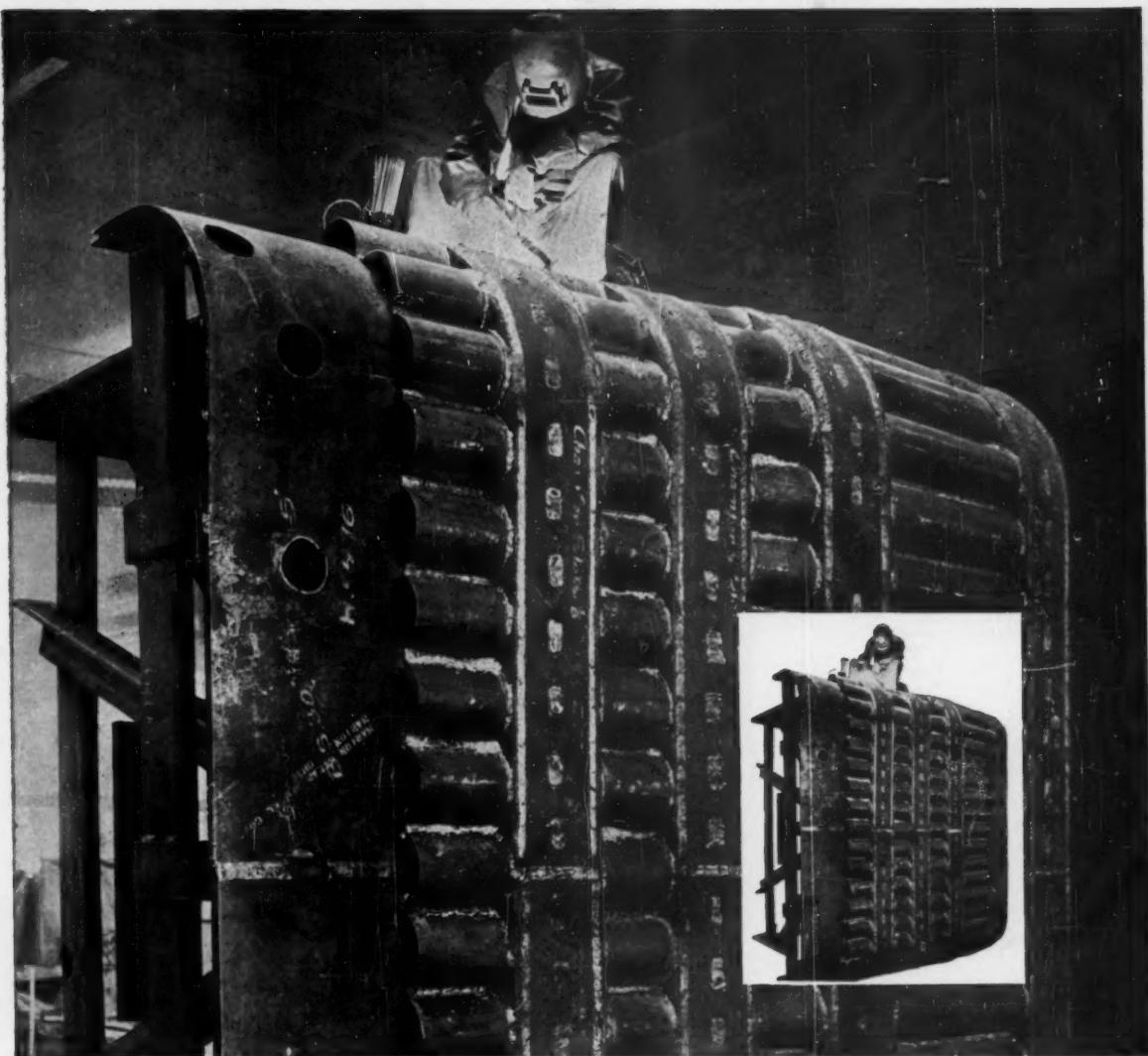
Characteristics and uses of three research reactors now for sale are described in a dozen page brochure. Words and pictures depict specific uses, design characteristics, safety features and experimental facilities of the swimming pool, heavy water and nuclear test reactors. *General Electric Apparatus Sales Div.*

For free copy circle No. 28 on postcard

### Small parts feeder

Small parts assembly feeders are described in new literature. Developed in conjunction with four leading appliance manufacturers, the units cut assembly costs by making parts conveniently available to workers and easier to grasp. In use, units can be combined to fit the parts requirements of any assembly operation. *Chas. Wm. Doepke Mfg. Co.*

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Another huge dipper for a Marion type 5561 stripping shovel—made entirely of Lukens "T-1" steel for extra strength, impact and

abrasion resistance—in the shops of Marion Power Shovel Company, Marion, Ohio.

*Fabricator of power shovels says:*

## "LIKE THE WAY TOUGH LUKENS 'T-1' STEEL WELDS AND HANDLES IN THE SHOP"

■ Marion Power Shovel Company's 45 cubic yard stripping shovels now deliver greater payloads with lower maintenance costs and longer service life at the strip mines. Sixty tons of Lukens "T-1" steel in the dipper stick, bail, door, and the dipper itself do the work that once took many extra tons

of ordinary steels. And Marion has experienced "no unusual welding problems since switching to this extremely high yield strength metal . . . very satisfied with the way it handles in the shop."

Lukens "T-1" steel is available in the widest range of plate sizes anywhere.

Figure it in your new plans.

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Do it now!

# LUKENS "T-1" STEEL

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS  
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA



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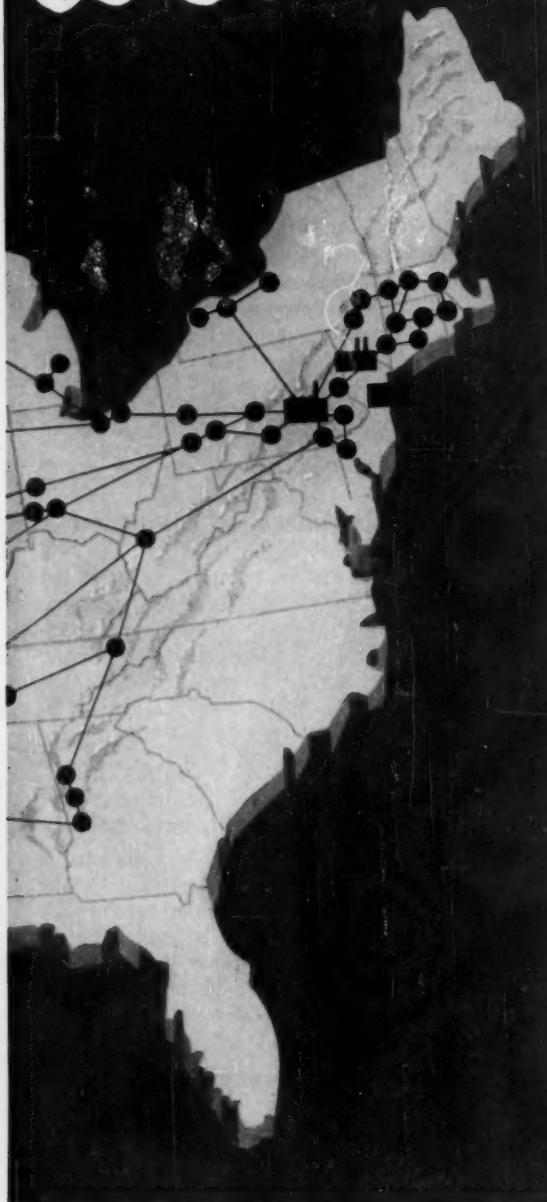
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If not, we believe it will be worth your while to place a call today. Especially if you're looking for the kind of service and cooperation that can lead to new savings in your own use of specialty steels.

For example, look at your inventory from the standpoint of the manpower and paper work required to handle it . . . the valuable space it may be wasting . . . the dollars that may be tied up unnecessarily.

Carpenter's ability to meet your day-to-day specialty steel needs quickly, and without hesitation can do much to help you reduce a host of inventory problems. We're continually building our stocks of tool, stainless and alloy steels for fast delivery . . . to enable you to trim your own stocks to more profitable levels.

Important, too, is the cooperation you'll get from the folks at Carpenter. Whether it involves the order desk people — your Carpenter Representative, the warehouse crew or the office staff — they're all part of a team working for you. Their constant aim is to help you hold down specialty steel costs and improve your results.

For service that's backed by more dependable action . . . and delivery that's backed by a wider selection of specialty steel grades and sizes—call Carpenter, now. The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.

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Astoria 8-0537

Newark, New Jersey  
MArket 2-1703

Pittsburgh, Pennsylvania  
Spalding 1-2404

Providence, Rhode Island  
DEXter 1-5769

Rochester, New York  
Hillside 2319

St. Louis, Missouri  
(currently moving  
to larger quarters)

(San Francisco Bay Area)  
Belmont, California  
Lytell 3-8461

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# Carpenter STEEL

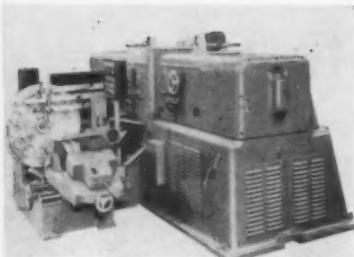
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Offices and Distributors in Principal U. S. Cities

## NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 73 or 74.

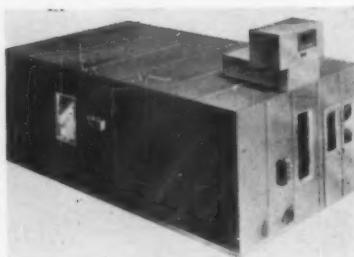


### Push-button grinder reduces production down-time

With push button controls on both sides, a grinding machine cuts production down-time. This includes set-up, dressing, changes, and maintenance. It has all spindle motors in its easily-accessible base. Other features include: at-a-glance reading of head and disk alignment, sealed spindle construction, push-

button dressing, automatic sizing adjustment for disk wear, edge-grain Formica wearing ways, head assembly neoprene sealed against dust and coolant and fast magnetic rotary through feed. It also offers easy disk removal. *The Besly-Welles Corp.*

For more data circle No. 29 on postcard, p. 73



### Pre-fab booths contain controlled environment

Prefabricated air conditioned booths range in size from 12 x 15 ft to 30 x 40 ft. Clear span ceiling for each size range from 8 ft 6-in. inside to 18 ft. Sheet metal wall panels are finished in baked enamel, with 4 in. of plastic foam insulation separating inner and outer surfaces. Booths maintain a tem-

perature of 68°F,  $\pm 1^{\circ}\text{F}$ , and will hold relative humidity below 50 pct as per the military specification. Uses are: for precision measurement, gage inspection and repair, jig boring rooms, close tolerance final assembly, etc. *Agnew-Higgins, Inc.*

For more data circle No. 30 on postcard, p. 73

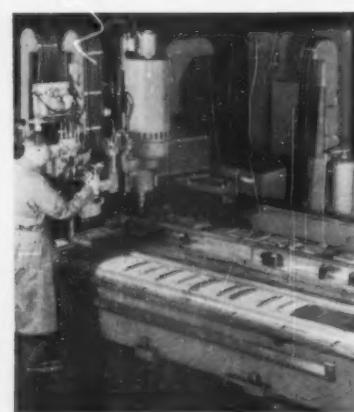


### Rotary table base operated vertically, horizontally

A new 12-in. rotary table is designed for simplification of circular and rotary machining operations. It features a base allowing both horizontal and vertical operation. The table incorporates a ground lead screw. The main bearing is

bronze. Center-Hole run out is guaranteed to be no more than 0.0005-in. and parallelism through 360° of rotation is guaranteed to 0.0001-in. *Universal Vise & Tool Co.*

For more data circle No. 31 on postcard, p. 73



### Router doesn't depend on operator's strength

This router does not depend on the operator's strength to obtain maximum efficiency. With the power-assist mechanism the operator does not actually supply the force required to feed the cutter. Sizable work capacity is provided by a four-speed vertical spindle head rated at 15-hp at 7200-rpm. Power is provided for all three basic movements. Longitudinal movement of the gantry and transverse movement of the saddle are controlled by the operator through a power-assist mechanism. Depth

movement is controlled by a conveniently located push button unit with the downward movement being limited by a 6-station manually indexed turret stop mounted on the saddle. Spindle speed changes are by means of push buttons located on the power-assist handles. The rigidly braced gantry is arranged on an angle for an unobstructed view of both the follower and cutter. The stationary table is 19-ft long by 5½-ft wide. *Sundstrand Machine Tool Co.*

For more data circle No. 32 on postcard, p. 73



### Console model hardness tester is fully automatic

With this unit, it is possible to automatically classify up to 1000 Rockwell tests per hour on large production runs by hand-feeding individual pieces. The console model fully automatic hardness tester performs basically the same as the manufacturer's hand-operated units. It will test any metal on the regular Rockwell scale. Tested workpieces are classified into one of three categories: correct, too hard or too soft. The device controls hardness limits as

close as two Rockwell numbers. It is equipped with an automatic counter and has an automatic safety stop for pieces not fed properly. Workpieces may be tested in two ways: manual feed and manual disposal; and semi-automatic, with manual loading and automatic disposal and classification as to hardness. A simple change lets it test 0.030 to 6-in. materials. *American Chain & Cable Co., Inc.*

For more data circle No. 33 on postcard, p. 73

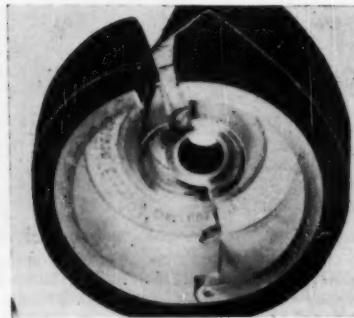


### Versatile unit answers need for several machines

This machine is designed for manufacturers with varied production. It offers them a one machine answer to the usual need for several machines. This is accomplished by building the initial machine from standard components. These are added, subtracted, or re-arranged

as production changes from one job to another. Each set-up functions as if it were custom designed to facilitate that particular production. It adapts to simple or complex drilling, reaming, tapping or milling. *Turner Bros., Inc.*

For more data circle No. 34 on postcard, p. 73

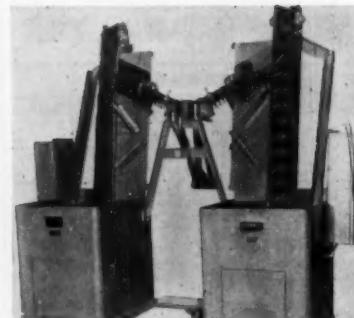


A 4-in. diameter drum sander grinds, buffs and polishes with portable high speed grinders. This small diameter sander operates at speeds up to 6000 rpm. Weight of the new abrasive wheel is just one pound. It is a split drum sander made to accommodate ordinary strips of coated abrasives. These can be torn off standard abrasive

### Drum sander grinds, buffs and polishes

rolls. Abrasive strips, when used on the sander, will perform the same work as endless belt type grinders. It is now made in only one width: 1½-in. It is available with arbor hole diameters of ½, 5/8 or ¾-in. The rubber cushion is 50 durometer neoprene rubber which will run in oil or grease. *American Diamond Saw Sales.*

For more data circle No. 35 on postcard, p. 73

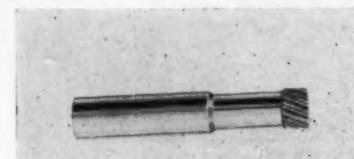


### Two feeders, mounted together, solve problem

Faced with the problem of feeding two streams each of two different sized parts to a production machine at one time, one manufacturer came up with the idea of using two feeders. One left and one right hand delivery is used. These are mounted together, combining their delivery chutes to feed four streams of oriented parts at one time to an automatic drilling machine. Each

feeds a stream of oriented parts into a delivery chute where they are subdivided by a shuttle device into two chutes. This provides the four streams of parts which the drilling machine will accommodate. The two units are made fully portable by being mounted on a single base with heavy casters. *Feedall, Inc.*

For more data circle No. 36 on postcard, p. 73



### Miniature burrs grind extremely small holes

Miniature hole grinding burrs grind extremely small holes in hardened steel up to Rockwell C-23. Recommended speed is 100,000 rpm. *The Atrax Co.*

For more data circle No. 37 on postcard, p. 73

# CONTROLLED PRESSURE AT 100,000 PSI!

**Superior super pressure quality tubing has been used to handle internal pressures from 15,000 to 100,000 psi—offers high fatigue strength, chemical resistance and burst pressure to spare**

In any industry, handling liquids and gases safely and efficiently under extremely high pressures can be done best by using only top-quality tubing. And Superior specializes in premium quality super-pressure tubing.

Superior produces this tubing from specially selected raw materials which have had the inside surfaces conditioned to remove fissures and other defects. In processing, special degreasing operations are performed on the tubing, and the inside diameters are sand blasted to insure a clear, smooth surface.

Two types of Superior super pressure tubing are available: a single wall mechanical tubing and a double wall, or composite unit, made from two thinner tubes.

Super pressure tubing is produced in an annealed condition and in  $\frac{1}{8}$  hard

temper, and to mechanical properties specified by the customer.

This tubing is offered in the austenitic stainless steels, Types 304, 316, 321 and 347 and in AISI 4130 alloy steel. It is produced in sizes  $\frac{1}{8}$ " OD x  $\frac{1}{16}$ " ID up to  $\frac{3}{4}$ " OD x  $\frac{1}{16}$ " ID. Minimum order quantity for mill production is 50 ft. per size and analysis.

Superior rigidly inspects all super pressure tubing for defects such as fissures by visual and microscopic inspection methods. Each length is hydrostatically tested to 5000 psi—upon request, up to 60,000 psi.

If you have a tubing problem in high pressure processing—or of any other nature—call on Superior. Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa., for Data Memorandum 22.



The composite type stainless super pressure tubing offers the advantage of having the inner and outer tubes independently worked to mechanical property requirements and of different alloys being combined for strength and corrosion resistance.

SUPER PRESSURE TUBING MINIMUM BURSTING PRESSURES FOR AUSTENITIC STAINLESS STEELS AND 4130 ALLOY STEELS				
OD	MAXIMUM WALL			
	.053	.095	.156	.218
$\frac{1}{8}$	*97,200 84,400			
$\frac{1}{4}$	*40,200 34,800	82,000 71,000		
$\frac{3}{8}$	*17,400 15,000	33,500 29,100	62,500 54,000	
$\frac{1}{2}$	*13,600 11,800	25,000 21,600	47,600 40,300	72,600 63,000

\*Top figures all Austenitic Stainless Steels  
Bottom figures all 4130 Alloy Steels

# Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to  $\frac{1}{8}$ " OD—certain analyses in light walls up to  $2\frac{1}{2}$ " OD

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • Raymond 3-1331

## The Iron Age SUMMARY...

**More bad news for steel plate users... Oil tanker speedup will siphon plate from an already-tight market... Steel loses fast-tax battle... Market condition tightens.**

**Plate Crisis Worsens...** The handwriting is on the wall for steel plate users. Pressure for speedup of oil tanker construction will channel plate from an already-tight market to the shipyards. A formal allocation program is out. But a "voluntary" system will accomplish the same purpose.

Bad news for plate users has been brewing since Nasser took over the Suez Canal. Subsequent blocking of the Canal and the sabotaging of oil pipelines added fuel to the fire. The resulting shortage of oil in Europe provided the clincher.

While a formal government allocation program has been killed, steel plate producers will have to see to it that oil tanker builders get the plates they need for new construction and repairs. This will disrupt regular distribution of plate throughout the nation. Other plate users will have to tighten their belts another notch or so.

**Battle Lost...** Meanwhile, steel producers have lost their battle for fast tax writeoffs on new steel capacity. Over \$2 billion worth of steel expansion projects are on file with the Office of Defense Mobilization for fast-tax consideration. But top policymakers in the Administra-

tion have turned thumbs down.

Steel mills have made a strong pitch to Washington officialdom to minimize impact of the oil tanker crisis on regular plate users. They are insisting that before extra plate tonnages are channeled to shipyards that steps be taken to make sure that (1) other parts are available such as boiler tubes and motors, (2) that oil will be available when the tankers are completed, (3) that the tankers will actually be needed, and (4) that other plate users just as important to the economy are not hamstrung.

**More Steam...** While attention is focused on the tankers and fast-tax questions, the steel market is building up more steam—and generating a few odd twists. For instance, the hot-rolled bar market is strong. But it could be stronger. And the reason is that freight car builders, for one, are hampered by the shortage of plate and structurals. So they're gauging their hot-rolled bar orders on how much plate and structurals they get.

Holiday production schedules cut into finished and raw steel output this week. Even though the mills held these losses to a minimum, the effect was to aggravate heavy backlog and set back delivery for many steel users.

## Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
<b>Ingot Index (1947-1949=100)</b>	148.7	156.3	154.8	145.5
<b>Operating Rates</b>				
Chicago	99.0	102.0	102.0	99.0
Pittsburgh	95.0	101.0	96.0	100.0
Philadelphia	101.5	105.0	104.0	100.0
Valley	85.0	99.0	99.0	92.0
West	100.0	101.0	103.5	98.0
Detroit	100.0	100.0	107.0	95.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	85.0	104.0	106.5	95.0
Birmingham	92.0	94.0	95.0	92.0
S. Ohio River	78.0	91.0	96.0	90.0
Upper Ohio R.	96.0	103.0	105.0	100.0
St. Louis	94.0	99.0	102.0	103.0
Northeast	99.0	100.0	100.0	82.0
<b>Aggregate</b>	97.0	102.0	101.0	97.0

\*Revised

December 27, 1956

## Prices At A Glance

(cents per lb unless otherwise noted)				
	This Week	Week Ago	Month Ago	Year Ago
<b>Composite price</b>				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	\$63.04	\$63.04	\$63.04	\$59.09
Scrap, No. 1 hvy (gross ton)	\$63.50	\$64.50	\$64.33	\$53.00
<b>Nonferrous</b>				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	36.00	36.00	36.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	102.25	102.875	111.50	109.375
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

\*Revised

## More Prices Are Advanced

**U. S. Steel joins other producers in moving up nickel-bearing stainless steels . . . Group increasing extras is growing . . . Freight rates higher.**

♦ MORE DENTS in the price wall came this week as mills raised extras on sheet and strip, stainless base prices, and, in one case, a plate base price.

U. S. Steel joined other producers in advancing base prices of its nickel-bearing stainless steels by \$15 to \$120 a ton. Rise was related to recent advance in nickel costs, the corporation said.

In addition, revisions in certain of its extras for carbon and low alloy-high strength steel sheets were announced by U. S. Steel Corp. and its general operating divisions, Columbia-Geneva Steel and Tennessee Coal and Iron. Move is similar to those announced earlier by other producers.

Changes by U. S. Steel include increases of 5 to 30 cents per hundred pounds in gage and width extras. There are also raises of 5 to 20 cents per hundred pounds in certain quality and chemical extras. In addition, the hot-rolled sheet extra for carbon over 25 to 40 pct will be inclusive of special soundness quality. Revisions were effective December 19.

Sharon Steel Corp. has increased certain size extras, quality and analyses on hot-rolled sheets and strip by approximately 2 3/4 pct.

Youngstown Sheet and Tube and Pittsburgh Steel have advanced extra charges on hot and cold-rolled sheets in line with hikes posted by other producers earlier. Adjustments raised delivery prices by slightly less than 3 pct.

Producers of cold-rolled spring steel have lowered prices on product with a carbon content of 61 to 80 pct by 60¢ per hundred lb. (New prices appear on p. 95)

Colorado Fuel & Iron Corp. has raised the base price of carbon plate at Claymont, Del. by \$7.00

per ton effective Dec. 20. The increase advanced the price to \$5.70 a hundred pounds equal with that at the company's Minnequa, Col. basing point.

The Suez Crisis has softened foreign demand for steel by cutting back fabricating operations in Europe. Many U. S. companies had kept in the European markets, despite heavy domestic demand, on the theory that they would fill the gap if U. S. markets fell.

The supply situation, of course, does not apply to ship plate, oil well tubing and pipe where the mideast stalemate has tightened already tight markets.

Another producer—Crucible Steel Co. of America—has increased prices of nickel-bearing stainless steels. Boosts were similar to those posted earlier by Allegheny Ludlum Steel Corp. They range from 1 1/2 to six cents a lb on the more common grades, depending on nickel content.

Higher freight rates—adding to steel industry costs—will go into effect soon. The Interstate Commerce Commission authorized the increases, averaging 7 pct in the

East and 5 pct in the West, on Dec. 17. The nation's railroads served notice they expect to put the higher rates into effect without delay.

**BARS . . .** Rolling schedules at Cleveland are just about full on hot-rolled bars through January and into February. However, there's little accumulated backlog. Principal reason is unwillingness of freight car builders to order bars until they're sure they can get the needed plate and structural. Cold finished bars in Cleveland are still available for a few weeks' delivery for the standard sizes. Alloy cold-drawn bars are still slow, largely because of bottlenecks in heat treating ovens.

The unseasonably mild weather in the Eastern area in recent weeks has stimulated the sales of reinforcing bars. Builders, able to keep going on construction projects, are responsible for brisk business in this product, a large Philadelphia warehouse reports. Sales are above the usual rate for this time of year.

West Coast mills are booked to capacity on both bars and structural.

**SHEET AND STRIP . . .** Cleveland producers have just about filled rolling schedules for cold-rolled sheet through February. Reason is heavier auto ordering.

Some Pittsburgh area mills, however, are offering tonnages to warehouses for delivery in January and on through the first quarter. Warehouses are loaded with sheet so that spot deferrals and cancellations at the mills are going begging.

**TUBING . . .** Alloy seamless tubing up to 40 ft long and weighing up to 3500 lb is being made at the newly renovated piercing mill of Timken Rolling Bearing Co., Canton, O. The \$1.25 million expansion, just completed, will help meet the demand for oil country seamless tube. The remodeling job was completed with virtually no interruption of regular production.

**STAINLESS . . .** Most stainless products are booked solidly through February, reports one Pittsburgh producer. Cold-rolled strip is continuing its pickup.

Major warehouses in Philadelphia area describe stainless inventories as getting acute, especially in plate.

At Cleveland, stainless steel wire and strip are being ordered as far ahead as February. Cleveland mills are 30 pct filled on these products for that month.

### Purchasing Agent's Checklist

**TRANSPORTATION:** Big rush to the shipyards for tankers . . . . . p. 25

**RESEARCH:** Profits begin in the laboratory . . . . . p. 27

**MARKETING:** Construction boom aids plumbing fixture business . . . . . p. 30

**WEST COAST:** San Francisco begins drive to reduce number of products it imports . . . . . p. 43

**MACHINE TOOLS:** Higher speeds in aircraft industry will mean new metals, revised machine tools . . . . . p. 45

## Comparison of Prices

(Effective Dec. 28, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 25 1956	Dec. 18 1956	Nov. 27 1956	Dec. 28 1956
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.825¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.825
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainless C-R strip (No. 302)	56.00	47.50	47.50	44.50

### Tin and Terneplate: (per base box)

Tinplate (1.50 lb.) cooke	\$9.95	\$9.95	\$9.95	\$9.05
Tinplate, electro (0.50 lb.)	8.65	8.65	8.65	7.75
Special coated mfg. terne	9.20	9.20	9.20	7.85

### Bars and Shapes: (per pound)

Merchant bars	5.075¢	5.075¢	5.075¢	4.85¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	40% - 43%	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	11.50

### Wire: (per pound)

Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
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### Rails: (per 100 lb.)

Heavy rails	\$5.075	\$5.075	\$5.075	\$4.725
Light rails	6.00	6.00	6.00	5.65

### Semi-finished Steel: (per net ton)

Rerolling billets	874.00	874.00	874.00	768.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slab	107.00	107.00	107.00	96.00

### Wire Rod and Skelp: (per pound)

Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225

### Finished Steel Composite: (per pound)

Base price	5.622¢	5.622¢	5.622¢	5.174¢
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### Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

### PIG IRON

Dollars per gross ton, i.e.,  
subject to switching charges.

### STAINLESS STEEL

←To identify producers, see Key on P. 94→

Dec. 25  
1956

Dec. 18  
1956

Nov. 27  
1956

Dec. 28  
1956

<b>Pig Iron: (per gross ton)</b>				
Foundry, del'd Phila.	67.76	67.76	67.76	66.59
Foundry, Valley	68.00	68.00	68.00	62.98
Foundry, Southern Cinti	67.17	67.17	67.17	59.00
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb. 74 to 76 per Mn base.	11 1/4-12 1/4¢	11 1/4-12 1/4¢	11 1/4-12 1/4¢	9.50¢

<b>Pig Iron Composite: (per gross ton)</b>				
Pig iron	\$63.04	\$63.04	\$63.04	\$59.09

<b>Scrap: (per gross ton)</b>				
No. 1 steel, Pittsburgh	265.50	266.50	266.50	253.50
No. 1 steel, Phila. area	62.50	62.50	62.50	54.50
No. 1 steel, Chicago	62.50	64.50	64.50	51.50
No. 1 bundles, Detroit	62.50	62.50	62.50	51.50
Low phosph., Youngstown	70.50	70.50	69.50	55.00
No. 1 mach'y cast, Pittsburgh	61.50	61.50	61.50	55.50
No. 1 mach'y cast, Philadelphia	60.50	60.50	58.50	56.50
No. 1 mach'y cast, Chicago	57.50	58.50	58.50	56.50

<b>Steel Scrap Composite: (per gross ton)</b>				
No. 1 heavy melting scrap	\$63.50	\$64.50	\$64.50	\$58.00

<b>Coke, Connellsville: (per net ton at oven)</b>				
Furnace coke, prompt	\$15.50	\$15.50	\$15.50	\$14.25
Foundry coke, prompt	\$18-19	\$18-19	\$18-19	\$16.25

<b>Nonferrous Metals: (cents per pound to large buyers)</b>				
Copper, electrolytic, Conn.	36.00	36.00	36.00	43.00
Copper, Lake, Conn.	36.00	36.00	36.00	43.00
Tin, Straits, New York	102.375	102.375	111.50	109.375
Zinc, East St. Louis	13.50	13.50	13.50	15.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	36.00	36.00	36.00	38.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

↑ Tentative. \* Average. \*\* Revised.

### Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

### Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Base price cents per lb. i.e., mill.

Producing Point	Basic	Fdry.	Mill.	Bess.	Low Phos.	Product	201	202	301	302	303	304	316	321	347	483	410	416	434
Bethlehem B3	64.50	65.00	65.50	66.00		Ingot, re-rolled	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Bethelbore, Pa. B6	64.50	65.00	65.50	66.00		Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	28.75	—	21.00
Birmingham R3	58.50	58.00*				Billets, forging	—	33.00	33.75	34.00	37.00	38.00	56.25	42.25	50.25	30.75	27.25	27.75	
Birmingham W3	58.50	58.00*	62.00			Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	33.00	33.00	34.00
Birmingham U4	58.50	58.00*	63.00			Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	35.50	35.50	34.50
Buffalo R3	62.50	63.00	63.50	64.00		Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	40.25	
Buffalo H1	62.50	63.00	63.50	64.00		Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	52.25	—	29.75	—	30.75
Buffalo W6	62.50	63.00	63.50	64.00		Strip, cold-rolled	41.50	45.25	47.75	47.50	52.00	52.25	74.75	60.00	73.00	46.50	38.75	40.25	
Chester P2	64.50	65.00	65.50	66.00		Wire CF; Rod HR	—	37.25	38.35	38.75	41.50	48.75	63.00	68.00	56.25	34.50	31.00	31.50	31.50

### Allegheny Ludlum, Crucible Steel and U. S. Steel up to 6¢ higher on nickel-bearing grades.

### STAINLESS STEEL PRODUCING POINTS:

Sheild: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, A7; Middlebury, Pa., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Philadelphia, D5.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; Leechburg, Pa., A2; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1 (25 ppr lb higher); New Bedford, Mass., R6; Gary, U1 (25¢ per lb higher).

Bars: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, I4; Philadelphia, D5; Detroit, R5; Gary, U1.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Toledo 14; Toledo 16; Troy, N. Y., R3; Troy, N. Y., R3; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structural: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, O., R3; Philadelphia, D5; Vandergrift, Pa., U1; Gary, U1.

Forgings: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A5; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1.

## Prices Break In Chicago

**A \$2 drop in the price of most grades in this major market may mean the beginning of a general price decline . . . Slight decline reported in Boston.**

♦ FOR THE SECOND time in a month Chicago scrap prices broke. A clear cut drop of \$2 for most grades in this major district sent THE IRON AGE Composite down.

Stubborn mill resistance to abnormally high prices had this market teetering since the sudden surge late in November.

**A last-minute purchase by a Pittsburgh mill dropped the price in that area to \$65-\$66 for No. 1. Iron Age Composite fell to \$63.50.**

Other markets remained virtually unchanged with some signs of additional weakness counterbalanced somewhat by strength in scattered areas. Whether the Chicago break is local or whether it is the start of a general downward trend remains to be seen.

One fact is certain. It will not strengthen other markets.

There are other signs of easier things to come for the mills, not only in easing prices, but perhaps even more important, increased amounts of scrap.

Best hope for additional scrap comes from Detroit where January auto lists indicate probably record tonnages available. One of the Big Three auto plants is said to have 40,000 tons of bundles on its January lists, perhaps a record high tonnage.

This has led to speculation that automotive lists will be off several dollars. If this is the case, other prices will follow the industrial lists in a downward trend.

But immediate easing was not in the offing as the holiday lull approached. Lower prices in most cases remained in the talking stage.

Some outlying areas were affected as mills ceased to reach out as far for scrap as they had in

past weeks. Price of steelmaking grades in Boston, for example, dropped slightly.

While additional downward prices seem in the cards, demand from mills is expected to continue strong, in view of the top operating rates. Some small electrical mills that rely entirely on scrap have reached the point where the high price of good scrap is cutting heavily into profits.

**Pittsburgh . . .** Anticipated weakening of the Pittsburgh market has not materialized. Openhearth scrap is still scarce. Shipments are light; dealers are reported to be oversold. Feeling now is that there will be new mill buying within a week and that there will be no drop in prices paid. However, the next industrial lists are expected to show lower prices. And there is little demand for low phos at this time. Cast grades and turnings remain firm.

**Chicago . . .** Prices dropped \$2 across the board for all grades with the exception of some cast and railroad specialties. Mill resistance to high prices is having effect, and pressure is still being exerted to bring prices down even lower. A major consumer is offering \$67 for No. 1 factory bundles, but tonnages moving on this offer so far are negligible. However, it is having the effect of injecting more weakness into the market. While mills claim to be holding heavy inventories of factory material, stocks in dealers yards continue low. So there are forces working both ways.

**Philadelphia . . .** Demand was somewhat weaker in the domestic market but export activity continues strong. Except for a spread in No. 2 steelmaking grades, prices remained unchanged. Sales of No. 2 grades at two different prices accounted for the spread. Most yards were closed for the four-day Christmas holiday, and little activity is expected until after New Year's. The market is in the throes of "holiday apathy."

**New York . . .** Year end quiet prevailed in the market here. The market is holding firm at present prices, probably won't get a new test until after the first of the year.

**Detroit . . .** Evidence of a softening market continues here, although there will be no real test of strength until the January lists close. Market observers are predicting a significant drop in prices along with weakening markets elsewhere. One possible clue is the tremendous amount of scrap which will be produced in January. One of the Big Three auto producers will have what may be the largest list ever made. Amount of bundles is estimated at close to 40,000 tons.

**Cleveland . . .** Many large brokers feel they had an average to weak year profitwise, because of the steady rise in prices, through the year. In addition, cost of doing business increased steadily. Dealers here and in the Valley probably had one of their better years. The market remains firm but quiet.

**Birmingham . . .** The scrap market in this district is showing its usual pre-Christmas dullness, with little trading reported. What buying there has been was at unchanged prices.

**St. Louis . . .** A Mopac list of 125 to 150 carloads of scrap, including 90 cars of No. 1 railroad heavy melting, brought unchanged prices and there is feeling here that secondary grade prices are levelling off.

**Cincinnati . . .** Some weakness continues at the conversational level in a generally quiet market. Prices in January are expected to decline slightly with dealers holding out for better price.

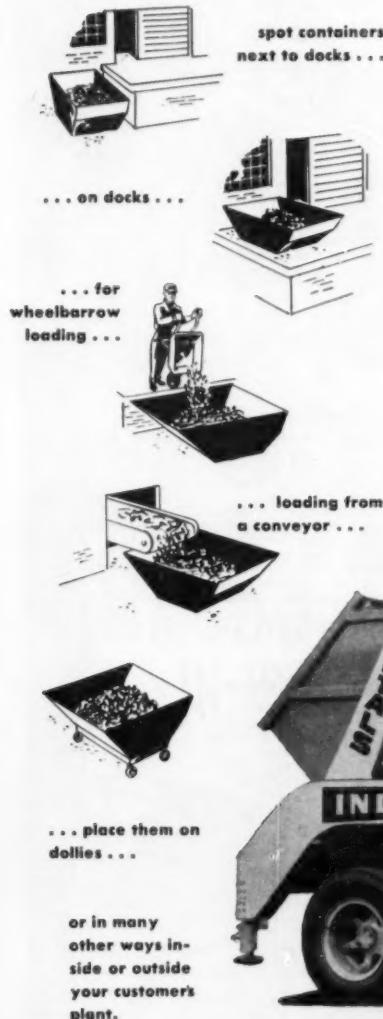
**Buffalo . . .** This market has been inactive and evidence of some weakness is creeping in. Some dealers think the price might ease as much as \$2 a ton on steelmaking grades after the first of the month.

**Boston . . .** Prices of steelmaking grades dropped \$1 on a generally weakening market. Some of the mills that were active in New England have dropped out of the market. What scrap is moving is doing so at lower levels. Export is also weak, contributing to the general decline.

**West Coast . . .** There is little evidence of a market change here. Mills are able to obtain necessary tonnages under the present market.

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## Scrap Prices (Effective Dec. 25, 1956)

### Pittsburgh

No. 1 hvy. melting	\$65.00 to \$66.00
No. 2 hvy. melting	58.00 to 59.00
No. 1 dealer bundles	65.00 to 66.00
No. 1 factory bundles	74.00 to 75.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	43.00 to 44.00
Mixed bor. and m'tn.	43.00 to 44.00
Shoveling turnings	45.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. punch'g plate	72.00 to 73.00
Heavy turnings	59.00 to 60.00
No. 1 RR. hvy. melting	71.00 to 72.00
Scrap rails, random lgth.	79.00 to 80.00
Rails 2 ft and under	83.00 to 84.00
RR. steel wheels	75.00 to 76.00
RR. spring steel	75.00 to 76.00
RR. couplers and knuckles	75.00 to 76.00
No. 1 machinery cast	61.00 to 62.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	52.00 to 53.00

### Chicago

No. 1 hvy. melting	\$62.00 to \$63.00
No. 2 hvy. melting	52.00 to 53.00
No. 1 dealer bundles	63.00 to 64.00
No. 1 factory bundles	69.00 to 70.00
No. 2 bundles	48.00 to 49.00
Machine shop turn.	39.00 to 40.00
Mixed bor. and turn.	41.00 to 42.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	41.00 to 42.00
Low phos. forge crops	72.00 to 73.00
Low phos. punch'g plate	69.00 to 70.00
Low phos. 3 ft and under	67.00 to 68.00
No. 1 RR. hvy. melting	69.00 to 71.00
Scrap rails, random lgth.	82.00 to 83.00
Rerolling rails	92.00 to 93.00
Rails 2 ft and under	88.00 to 89.00
Locomotive tires, cut	72.00 to 73.00
Cut bolsters & side frames	72.00 to 73.00
Angles and splice bars	77.00 to 78.00
RR. steel car axles	91.00 to 92.00
RR. couplers and knuckles	71.00 to 72.00
No. 1 machinery cast	57.00 to 58.00
Cupola cast	52.00 to 53.00
Heavy breakable cast	51.00 to 52.00
Cast iron brake shoe	49.00 to 50.00
Cast iron wheels	58.00 to 59.00
Malleable	72.00 to 73.00
Stove plate	49.00 to 50.00
Steel car wheels	72.00 to 73.00

### Philadelphia Area

No. 1 hvy. melting	\$62.00 to \$63.00
No. 2 hvy. melting	53.00 to 56.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	51.00 to 53.00
Machine shop turn.	45.00 to 46.00
Mixed bor. short turn.	45.00 to 46.00
Cast iron borings	45.00 to 46.00
Shoveling turnings	48.00 to 49.00
Clean cast chem. borings	51.00 to 52.00
Low phos. 5 ft and under	67.00 to 68.00
Low phos. 2 ft and under	69.00 to 70.00
Low phos. punch'g	69.00 to 70.00
Elec. furnace bundles	64.00 to 65.00
Heavy turnings	58.00 to 59.00
RR. steel wheels	73.00 to 74.00
RR. spring steel	73.00 to 74.00
Rails 18 in. and under	81.00 to 82.00
Cupola cast	55.00 to 56.00
Heavy breakable cast	58.00 to 59.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast	60.00 to 61.00

### Cleveland

No. 1 hvy. melting	\$64.50 to \$65.50
No. 2 hvy. melting	55.00 to 56.00
No. 1 dealer bundles	64.50 to 65.50
No. 1 factory bundles	71.00 to 72.00
No. 2 bundles	46.00 to 47.00
No. 1 busheling	64.50 to 65.50
Machine shop turn.	35.00 to 36.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Cut struct'r'l plates, 2 ft. & under	68.50 to 69.50
Drop forge flashings	65.50 to 66.50
Low phos. punch'g plate	65.50 to 66.50
Foundry steel, 2 ft & under	61.00 to 62.00
No. 1 RR. heavy melting	70.00 to 71.00
Rails 2 ft and under	84.00 to 85.00
Rails 18 in. and under	85.00 to 86.00
Railroad grade bars	49.00 to 50.00
Steel axle turnings	44.00 to 45.00
Railroad cast	61.00 to 62.00
No. 1 machinery cast	60.00 to 61.00
Stove plate	54.00 to 55.00
Malleable	71.00 to 72.00

### Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

### Youngstown

No. 1 hvy. melting	\$67.00 to \$68.00
No. 2 hvy. melting	59.00 to 60.00
No. 1 dealer bundles	67.00 to 68.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	35.00 to 36.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	40.00 to 41.00
Low phos. plate	70.00 to 71.00

### Buffalo

No. 1 hvy. melting	\$60.00 to \$61.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 busheling	60.00 to 61.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	35.00 to 36.00
Low phos. plate	65.00 to 66.00
Scrap rails, random lgth.	63.00 to 64.00
Rails 2 ft and under	79.00 to 80.00
RR. steel wheels	65.00 to 66.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	74.00 to 75.00
No. 1 machinery cast	54.00 to 55.00
No. 1 cupola cast	48.00 to 49.00

### Detroit

No. 1 hvy. melting	\$59.00 to \$60.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	40.00 to 41.00
New busheling	59.00 to 60.00
Drop forge flashings	58.50 to 59.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'g plate	59.00 to 60.00
No. 1 cupola cast	51.00 to 52.00
Heavy breakable cast	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

### St. Louis

No. 1 hvy. melting	\$55.00 to \$57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	58.00 to 59.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Shoveling turnings	40.00 to 41.00
No. 1 RR. hvy. melting	66.00 to 67.00
Rails, random lengths	78.00 to 79.00
Rails 18 in. and under	86.00 to 87.00
Locomotive tires uncut	68.00 to 69.00
Angles and splice bars	70.00 to 71.00
Std. steel car axles	85.00 to 86.00
RR. specialties	70.00 to 71.00
Cupola cast	51.00 to 52.00
Heavy breakable cast	46.50 to 47.50
Cast iron brake shoes	54.00 to 55.00
Stove plate	44.00 to 45.00
Cast iron car wheels	56.00 to 57.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	45.50 to 46.50

### Boston

No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	52.00 to 53.00
No. 2 bundles	39.50 to 40.50
No. 1 busheling	52.00 to 53.00
Elec. furnace, 3 ft & under	54.00 to 55.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and short turn.	34.00 to 35.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	37.00 to 38.00
No. 1 machinery cast	47.00 to 48.00
Mixed cupola cast	43.00 to 44.00
Heavy breakable cast	45.00 to 46.00
Stove plate	41.00 to 42.00
Unstripped motor blocks	33.00 to 34.00

### New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$57.00 to \$58.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	47.00 to 48.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and turn.	41.00 to 42.00
Shoveling turnings	42.00 to 43.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast	54.00 to 55.00
Mixed yard cast	52.00 to 53.00
Heavy breakable cast	52.00 to 53.00
Unstripped motor blocks	41.00 to 42.00

### Birmingham

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	46.00 to 47.00
No. 3 bundles	38.00 to 39.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	39.00 to 40.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	37.00 to 38.00
Low phos. 18 in. & under	69.00 to 70.00
Rails, random lengths	76.00 to 77.00
Rails, 18 in. and under	82.00 to 83.00
No. 1 cupola cast	52.00 to 53.00
Angles & splice bars	68.00 to 69.00
Stove plate	51.00 to 52.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	54.00 to 55.00

### Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$62.00 to \$63.00
No. 2 hvy. melting	52.00 to 53.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	41.00 to 42.00
Mixed bor. and turn.	40.00 to 41.00
Shoveling turnings	43.00 to 44.00
Cast iron borings	40.00 to 41.00
Low phos. 18 in. & under	69.00 to 70.00
Rails, random lengths	76.00 to 77.00
Rails, 18 in. and under	82.00 to 83.00
No. 1 cupola cast	48.00 to 49.00
Hvy. breakable cast	47.00 to 48.00
Drop broken cast	59.00 to 60.00

### San Francisco

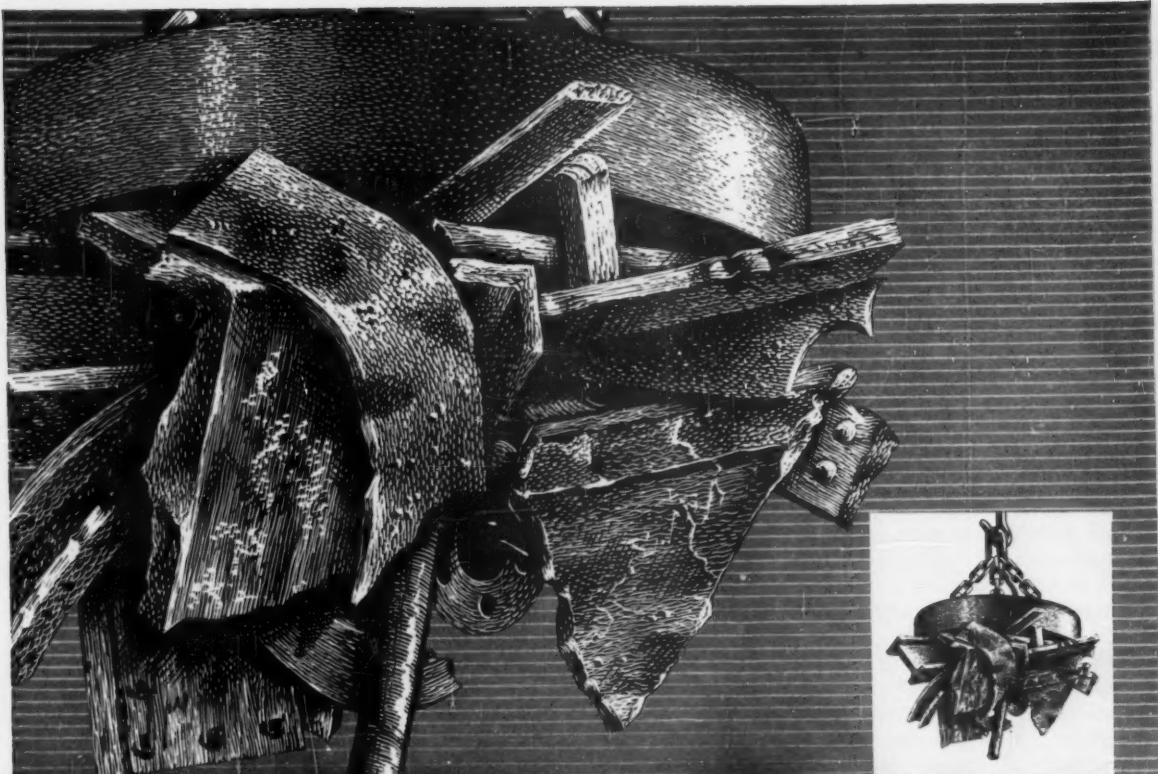
No. 1 hvy. melting	\$55.00
No. 2 hvy. melting	52.00
No. 1 dealer bundles	53.00
No. 2 bundles	40.00
Machine shop turn.	35.00
Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast	57.00

### Los Angeles

No. 1 hvy. melting	\$54.00
No. 2 hvy. melting	52.00
No. 1 dealer bundles	53.00
No. 2 bundles	38.00
Machine shop turn.	35.00
Shoveling turnings	38.00
Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast	56.00
Mixed yard cast	55.00

### Seattle

No. 1 hvy. melting	\$54.00
No. 2 hvy. melting	51.00
No. 2 bundles	\$33.00 to 35.00
No. 1 cupola cast	55.00
Mixed yard cast	55.00
Busheling	39.50
Bush., new fact., prep'd.	52.00
Bush., new fact., unprep'd.	48.00
Machine shop turn.	31.00
Short steel turn.	35.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00



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## Priority for Cu-Ni Ingots

**Consumers can now use defense priority ratings to buy copper-nickel ingots . . . ODM reports stockpiling of lead and zinc, barter program will continue.**

♦ LATEST government actions will brighten the picture for many nonferrous refiners, producers and consumers. Key moves are: (1) Authority granted to use priority rating to buy copper-nickel alloy ingots for defense contracts, (2) announcement of Office of Defense Mobilization that it will continue to buy zinc and lead through 1957.

The initial announcement by Business and Defense Services Administration grants brass mills, foundries and other users of copper-nickel alloy ingot containing at least 3 pct nickel authority to use priority ratings to obtain the ingot for defense orders.

The permission, in the form of an amendment to BDSA Regulation 2 goes further. It allows producers of the copper-nickel ingot in question to use priority ratings in buying nickel which will be used in ingot destined to fill defense rated orders.

Prior to this change, the regulation made no provision for use of ratings. Producers were forced to sell their nickel-containing ingot without a priority and were therefore able to show no preference ratings on their own orders for primary nickel.

The fact that the government will continue to buy lead and zinc came as no particular surprise. However, in making the announcement, ODM indicated that adjustments had been made in stockpile goals, within basic policy, to permit continued purchasing.

ODM would not say directly that goals for zinc and lead had been revised upward. However, the government agency did report that stockpile goals were definitely not "static," and never were static. Original goals, had been

300,000 tons of zinc, and 200,000 tons of lead.

Also to be continued in 1957 is the barter program, whereby the Commodity Stabilization Service is authorized to swap surplus American farm products for foreign zinc and lead. There is some talk that the pace of the program may be quickened, may even include metal of domestic origin. Such a program is under careful study as a possible boost to the American mining industry. The general idea would be to sell the farm products abroad and pay for the American metal with the cash obtained.

**ALUMINUM . . .** Another voice in the chorus predicting a very bright future for aluminum is Holbrook R. Davis, sales executive, Aluminum Co. of Canada. Mr. Davis foresees production of 4.5 million tons of aluminum per year in the free world by 1960.

### Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum ingot	27.10	25.80	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	38.00	40.00	10/26/56
Copper (CS)	35.50	35.75	12/19/56
Copper (L)	38.00	40.00	10/27/56
Lead, E. S. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	38.00	34.00	8/13/56
Magnesium pig	38.25	33.75	8/13/56
Nickel	74.00	64.00	12/6/56
Titanium sponge	230-275	270-300	12/4/56
Zinc, E. S. L.	13.00	13.00	1/8/56
Zinc, N. Y.	14.00	13.00	1/8/56

**ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 90.**

Of this, he expects one-half to be produced in the U. S. and about one-fourth in Canada. Here's how Mr. Holbrook expects two of the major markets for aluminum to stack up by 1960:

Electrical Industry—900,000 tons annually.

Oil Industry—150,000 tons annually.

New opportunities over the longer haul will include deeper penetration into the canning industry, says Mr. Davis. He commented, "Our best estimate is that by 1980 aluminum cans may represent five to ten pct of the canning industry's output."

Bureau of Mines report on bauxite indicates a continued trend toward the better quality Caribbean ores and away from the high silicate domestic ore.

Bauxite imports increased 3 pct during the third quarter over the second quarter. This was an all time high. Imports from Jamaica were 50 pct of the total, Surinam about 45 pct, with the remainder coming from British Guiana.

Domestic output was off 24 pct in the third quarter. One reason was shutdowns at some Aluminum Co. of America and Reynolds Metals installations. However, even if the mines had operated at capacity, it is doubtful whether an increase in line with the jump in imports could have been registered.

Here's how bauxite supply for domestic consumption stacks up for the past few years:

(long tons)	Imported	Domestic
1953	4,390,576	1,579,739
1954	5,258,530	1,994,896
1955	5,221,008	1,818,038
Nine months:		
1956	4,486,458	1,314,913
*1956	6,006,458	1,714,913

\*Iron Age Estimate

**COPPER . . .** Bureau of Mines reports domestic mine production of copper during October was up 9 pct over the previous month to 93,000 tons.

This brought total output for the first ten months of 1956 to 922,000 tons compared to 814,000 tons produced during the same period in 1955.

Smelter output topped September by roughly 10 pct. Refined copper output in October was also up.

Tin prices for the week: Dec. 19—102.50; Dec. 20—102.25; Dec. 21—102.00; Dec. 24—102.00.\*

\*Estimate.

## SPECIAL REPORT ON BRISTOL BRASS

Some time ago Bristol Brass was shut down for a few weeks. As the result we were forced to place a few orders for brass elsewhere to prevent our production from being seriously impaired.

One item that was purchased from an alternate source was a brass alloy for a clutch mechanism. Upon receipt of the stock from this source the material cracked in manufacturing. After considerable checking we found that Bristol Brass had made a study of that particular part to determine the best type of material to furnish for manufacturing it properly. They had done something a little bit special to the material for our application. There was no way it could be specified with S.A.E. numbers; it was just plain "know-how" from an analysis of the part, and it had only been recorded on Bristol Brass' records.

This is an extract from a report made by the Vice President in Charge of Manufacturing of a leading maker of precision instruments, to a meeting of his colleagues in Sales and Engineering.

... and for BRASS FORGINGS, too . . . get them from **ACCURATE BRASS CORP.** (Subsidiary of The Bristol Brass Corporation) now in a new and modern plant at Bristol, Conn.

### THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

*"Bristol-Fashion" means Brass at its Best*

## Nonferrous Prices (Effective Dec. 25, 1956)

### MILL PRODUCTS

(Cents per lb, unless otherwise noted)

#### ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

##### Flat Sheet (Mill Finish) and Plate (<sup>12</sup>" temper except 6061-T0)

Alloy	.032	.061	.136- .249	.250- .3
1800, 1100, 3003.....	44.3	42.1	40.9	40.2
5052.....	51.8	46.8	45.1	42.9
6061-T0.....	48.9	44.6	42.8	42.6

#### Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	45.5-47.3	61.3-65.1
12-14.....	46.2-47.7	62.2-66.8
24-26.....	49.4-49.5	73.1-77.8
36-38.....	58.3-59.0	97.4-101.0

#### Screw Machine Stock—2011-T3

Size"	1/4	3/8-5/8	5/8-1	1 1/4-1 1/2
Price	59.7	58.8	57.4	55.2

#### Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"	72	96	120	144
.019 gage.....	\$1.352	\$1.883	\$2.254	\$2.704
.024 gage.....	1.686	2.252	2.815	3.378

#### MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Type→	Gage→	.250	.250	.188	.081	.032
	3.00	2.00				
AZ31B Stand, Grade		67.9	69.0	77.9	108.1	
AZ31B Spec.		93.8	95.7	108.7	171.3	
Tread Plate		70.6	71.7			
Tooling Plate	73.0					

#### Extruded Shapes

Factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.8	104.2

#### Alloy Ingots

AZ91B (Die Casting)..... 37.25 (delivered)  
AZ63A, AZ62A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

#### NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR.....	113	97	118
Strip, CR.....	111	99	128
Rod, bar, HR.....	94	80	99
Angles, HR.....	94	80	99
Plates, HR.....	107	96	111
Seamless tube.....	144	120	190
Shot, blocks.....	78	...	

#### COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	58.13	55.36	58.32	
Brass, 70/30	50.19	50.73	50.13	53.10
Brass, Low	53.40	53.94	53.34	56.21
Brass, R L	54.54	55.08	54.48	57.35
Brass, Naval	54.14	54.45	57.55	
Munts Metal	52.10	54.00	54.00	
Comm. Br.	56.23	56.77	56.17	58.75
Mang. Br.	57.88	51.98	51.98	
Phos. Br. 5%	77.25	77.25	77.25	

#### Steel deoxidizing aluminum, notch bar

granulated or shot

Grade 1—95-97 1/2%	24.00-25.56
Grade 2—92-95%	23.25-24.50
Grade 3—90-92%	22.50-23.75
Grade 4—85-90%	21.75-22.75

#### SCRAP METALS

##### Brass Mill Scrap

(Cents per pound, add 1¢ per lb for  
shipments of 20,000 lb and over)

Heavy	Turnings
Copper	32
Yellow brass	34%
Red brass	28 1/2%
Comm. bronze	27 1/2%
Mang. bronze	23 1/2%
Yellow brass rod ends	24%

##### Customs Smelters Scrap

(Cents per pound carload lots, delivered  
to refinery)

No. 1 copper wire	30
No. 2 copper wire	28 1/2%
Light copper	26 1/2%
*Refinery brass	27
*Dry copper content	

##### Ingot Makers Scrap

(Cents per pound carload lots, delivered  
to refinery)

No. 1 copper wire	30
No. 2 copper wire	28 1/2%
Light copper	26 1/2%
No. 1 composition	27 1/2%
No. 1 comp. turnings	27
Hvy. yellow brass solids	20
Brass pipe	20
Radiators	22
Aluminum	

Mixed old cast	16 1/2%-17 1/2%
Mixed new clips	17-18
Mixed turnings, dry	16 1/2%-17

##### Dealers' Scrap

(Dealers' buying price, f.o.b. New York  
in cents per pound)

##### Copper and Brass

No. 1 copper wire

No. 2 copper wire

Light copper

Auto radiators (unsweated)

No. 1 composition

No. 1 composition turnings

Cocks and faucets

Clean yellow brass

Brass pipe

New soft brass clippings

No. 1 brass rod turnings

Aluminum

Alum. pistons and struts

Aluminum crankcases

1100 (25) aluminum clippings

Old sheet and utensils

Borings and turnings

Industrial castings

2024 (24S) clippings

Zinc

New zinc clippings

Old zinc

Zinc routings

Old die cast scrap

Nickel and Monel

Pure nickel clippings

Clean nickel turnings

Nickel anodes

Nickel rod ends

New Monel clippings

Clean Monel turnings

Old sheet Monel

Nickel silver clippings, mixed

Nickel silver turnings, mixed

Lead

Soft scrap lead

Battery plates (dry)

Batteries, acid free

Miscellaneous

Block tin

No. 1 pewter

Auto babbitt

Mixed common babbitt

Solder joints

Siphon tops

Small foundry type

Monotype

Lino. and stereotype

Electrotype

Hand picked type shells

Lino. and stereo. dross

Electro. dross

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.														
STEEL PRICES		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP							
(Effective Dec. 25, 1956)		Carbon Rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled		
EAST	Bethlehem, Pa.			\$107.00 B3		5.05 B3	7.40 B3	5.05 B3								
	Buffalo, N. Y.	\$74.00 B3, R3	\$91.50 B3, R3	\$107.00 B3, R3	5.90 B3	5.05 B3	7.40 B3	5.05 B3	4.875 B3, R3	6.85 R7	6.95 B3					
	Claymont, Del.															
	Harrison, N. J.													14.55 C11		
	Cooshehocken, Pa.		\$96.50 A2	\$114.00 A2						4.725 A2	6.90 A2	6.95 A2				
	New Bedford, Mass.										7.30 R6					
	Johnstown, Pa.	\$74.00 B3	\$91.50 B3	\$107.00 B3		5.05 B3	7.40 B3									
	Boston, Mass.										7.40 T8					
	New Haven, Conn.										7.30 D1					
	Baltimore, Md.										6.85 T8					
	Phoenixville, Pa.						5.85 P2	5.85 P2								
	Sparrows Pt., Md.								4.875 B3		6.95 B3					
	Bridgewater, Wallingford, Conn.	\$79.00 N8	\$96.50 N8	\$107.00 N8							7.30 W1	6.95 N8				
	Pawtucket, R. I.										7.48 A5, N7			14.90 N7		
MIDDLE WEST	Altam, Ill.								4.875 L1							
	Ashland, Ky.								4.875 A7							
	Canton-Massillon, Dever, Ohio		\$94.00 R3	\$107.00 R3, T5						8.85 G4		10.10 G4		14.55 G4		
	Chicago, Ill.	\$74.00 U1, R3	\$91.50 U1, R3, W8	\$107.00 U1, R3, W8	5.90 U1	5.00 U1, W8	7.35 U1, Y1	5.00 U1	4.875 N4	6.95 A1, T8				7.75 W8	14.55 A1, 59.78	
	Franklin Park, Ill.								4.875 A1, T8							
	Cleveland, Ohio									8.85 A5, J3				7.75 J3		
	Detroit, Mich.	\$74.00 R5		\$107.00 R5					4.775 G3, M2	6.95 M2, G3, D2, P1	7.05 G3	10.10 G3, D2	7.85 G3			
	Anderson, Ind.									8.85 G4		10.10 G4				
	Duluth, Minn.															
	Gary, Ind. Harbor, Indiana	\$74.00 U1	\$91.50 U1	\$107.00 U1, Y1	5.90 I3	5.00 U1	7.35 U1, I3	5.00 I3	4.875 U1, I3, Y1	6.85 Y1	6.95 U1, I3, Y1	10.20 Y1	7.75 U1, Y1			
	Sterling, Ill.	\$74.00 N4							4.775 N4							
	Indianapolis, Ind.									7.00 C5						
	Newport, Ky.													7.75 N5		
	Middletown, Ohio															
WEST	Niles, Warren, Ohio		\$91.50 S1, C10	\$107.00 S1, C10					4.875 S1, R3	6.85 T4	6.95 S1, R3	10.00 S1, R3	7.75 S1	14.55 S1		
	Sharon, Pa.															
	Pittsburgh, Pa.	\$74.00 U1, J3	\$91.50 U1, J3, C11	\$107.00 U1, C11	5.90 U1	5.00 U1, J3	7.35 U1, J3	5.00 U1	4.875 P6	6.750 P6	6.85 J3, B4, S7				7.75 S9	14.55 S9
	Midland, Pa.															
	Butler, Pa.															
	Portsmouth, Ohio															
	Wirtzton, Wheeling, Fallsburg, W. Va.						5.00 W3			4.875 W3	6.85 W3, F3	6.95 W3	9.85 W3			
	Youngstown, Ohio	\$74.00 R3	\$91.50 Y1, C10	\$107.00 Y1		5.00 Y1	7.35 Y1		4.875 U1, Y1	6.85 Y1, C3	6.95 U1, Y1	10.20 Y1	7.75 U1, Y1			
	Fontana, Cal.	\$83.50 K1	\$101.00 K1	\$128.00 K1		5.70 K1	8.85 K1	5.85 K1	5.475 K1	8.80 K1						
	Geneva, Utah	\$91.50 C7				5.00 C7	7.35 C7									
	Kansas City, Mo.					5.10 S2	7.45 S2		4.925 S3		7.20 S2					
	Los Angeles, Torrance, Cal.					5.70 C7, B2	8.85 B2		5.425 B2, C7	8.80 C7				8.95 B2		
	Minneapolis, Colo.					5.30 C6			5.775 C6							
	Portland, Ore.					5.75 O2										
	San Francisco, Niles, Pittsburg, Cal.					5.85 B2	8.80 B2		5.425 C7, B2							
	Seattle, Wash.					5.75 B2	8.10 B2		5.875 B2							
SOUTH	Atlanta, Ga.								4.875 A8							
	Fairfield, Ala. City, Birmingham, Ala.	\$74.00 T2	\$91.50 T2			5.00 T2, R3	7.35 T2		4.875 T2, R3	6.85 T2						
	Houston, Lone Star, Texas	\$89.00 L3	\$94.50 S2	\$112.00 S3		5.10 S2	7.45 S2		4.925 S2		7.20 S2					

## STEEL PRICES

(Effective Dec. 25, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

EAST	SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
	Hot-rolled 1/8 ga. & heavier	Cold- rolled	Galvanized	Enamel- ing	Long Tin	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	
	Bethlehem, Pa.											
Buffalo, N. Y.	4.675 B3	5.75 B3				6.90 B3	8.525 B3			5.80 W6		
Claymont, Del.												
Coatesville, Pa.												
Canonsburg, Pa.	4.725 A2	5.80 A2				6.95 A2						
Harrisburg, Pa.												
Hartford, Conn.												
Johnstown, Pa.										5.80 B3		
Fairless, Pa.	4.725 U1	5.80 U1				6.95 U1	8.575 U1					
New Haven, Conn.												
Phoenixville, Pa.												
Sparrows Pt., Md.	4.675 B3	5.75 B3	6.30 B3			6.90 B3	8.575 B3	9.275 B3	5.90 B3	5.80 B3	8.50 B3	
Worcester, Mass.										6.10 A5		
Trenton, N. J.												
Alten, Ill.										6.00 L1		
Ashland, Ky.	4.675 A7		6.30 A7	6.325 A7								
Canton-Massillon, Dover, Ohio			6.30 R3, R1									
Chicago, Joliet, Ill.	4.675 W8, A7					6.90 U1			5.80 K2	5.80 A5, R3, N4, W8, K2		
Sterling, Ill.										5.80 N4, K2		
Cleveland, Ohio	4.675 J3, R3	5.75 J3, R3		6.325 R3		6.90 R3	8.525 R3, J3			5.80 A5		
Detroit, Mich.	4.775 G3, M2	5.85 G3, 5.75 M2				7.00 G2	8.625 G3					
Newport, Ky.	4.675 A9	5.75 A9										
Gary, Ind. Harbor, Indiana	4.675 U1, I3, Y1	5.75 U1, I3, Y1	6.30 U1, I3	6.325 U1, I3, Y1	6.70 U1	6.90 U1, Y1, I3	8.525 U1, Y1			5.80 Y1	5.70 U1, Y1	5.80 U1, Y1
Granite City, Ill.	4.875 G2	5.95 G2	6.50 G2	6.525 G2								
Kokomo, Ind.			6.40 C9							5.80 C9		
Mansfield, Ohio		5.75 E2			6.70 E2							
Middletown, Ohio		5.75 A7	6.30 A7	6.325 A7	6.70 A7							
Niles, Warren, Ohio	4.675 S1, R3, N3	5.75 R3	6.30 R3	6.325 N3	6.70 N3	6.90 S1, R3	8.525 S1, R3				5.80 R3	
Sharon, Pa.												
Pittsburgh, Pa.	4.675 U1, J3, P6	5.75 U1, J3, P6	6.30 U1, J3	6.325 U1		6.90 U1, J3, R3	8.525 U1, J3	9.275 U1		5.80 A5, P6, J3	5.70 J3, U1	5.80 U1
Midland, Pa.												
Butler, Pa.												
Portsmouth, Ohio	4.675 P7	5.75 P7								5.80 P7		
Weirton, Wheeling, W. Va.	4.675 W3, W5	5.75 W3, W5, F3	6.30 W3, W5		6.70 W3, W5	6.90 W3	8.525 W3				5.80 W5	5.80 W5
Follansbee, W. Va.												7.15 W5
Youngstown, Ohio	4.675 U1, Y1	5.75 Y1		6.325 Y1		6.90 Y1	8.525 Y1			5.80 Y1		7.15 Y1
Fontana, Calif.	5.475 K1	6.95 K1				7.70 K1	9.725 K1				5.80 K1	5.95 K1
Genoa, Utah	4.775 C7											
Kansas City, Mo.											6.05 S2	
Los Angeles, Calif.											6.00 B2	
Terrance, Calif.												
Minneapolis, Calif.											6.05 C6	
San Francisco, Niles, Calif.	5.375 C7	6.70 C7	7.85 C7							6.45 C7	5.80 C7	5.95 C7
Pittsburg, Calif.												
Seattle, Wash.												
Atlanta, Ga.												
Fairfield, Ala.	4.675 T2, R3	5.75 T2, R3	6.30 T2, R3							5.80 T2, R3	5.80 T2	5.80 T2
Alabama City, Ala.												
Houston, Tex.										5.85 S2		

IRON AGE STEEL PRICES		<i>Italics</i> identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
(Effective Dec. 25, 1956)		BARS						PLATES			WIRE	
		Carbon † Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	
EAST	Bethlehem				6.125 B3	8.325 B3	7.40 B3					
	Buffalo, N. Y.	5.075 B3, R3	5.075 B3, R3	6.90 B5	6.125 B3, R3	8.325 B5, B3	7.40 B3	4.85 B3			7.28 W6	
	Claymont, Del.							5.70 C4		6.85 C4	7.55 C4	
	Coatesville, Pa.							5.25 L4		6.85 L4	7.55 L4	
	Conshohocken, Pa.							4.90 A2	5.925 A2	6.85 A2	7.25 A2	
	Harrisburg, Pa.							5.00 P2	6.275 P2			
	Hartford, Conn.			7.35 R3		8.625 R3	7.40 B3					
	Johnstown, Pa.	5.075 B3	5.075 B3		6.125 B3			4.85 B3		6.85 B3	7.25 B3	
	Fairless, Pa.	5.225 UI	5.225 UI		6.275 UI							
	Newark, N. J.			7.30 W10		8.30 W10						
	Camden, N. J.			7.30 P10		8.30 P10						
	Bridgeport, Conn. Putnam, Conn.	5.30 N8	5.30 N8	7.20 N8 7.40 W10	6.20 N8	8.475 N8	7.50 N8					
	Sparrows Pt., Md.		5.875 B3					4.85 B3		6.85 B3	7.30 B3	
	Palmer, Worcester, Roadville, Mass. Milton, Pa.	5.225 M7	5.225 M7	7.40 B5, C14		8.325 A5 8.625 B5					7.50 A5, W6 9.025 T8	
	Spring City, Pa.			7.30 K4		8.50 K4						
	Altan, Ill.	5.275 L7									7.48 L7	
	Ashland, Newport, Ky.							4.85 A7, N5		6.85 N5		
	Canton, Massillon, Ohio			6.85 R3, R2	6.125 R3, T5	8.325 R3, R2, T5						
MIDDLE WEST	Chicago, Joliet, Ill.	5.075 UI, R3, W8, N4 5.575 P13	5.075 UI, R3, W4 5.575 P13	6.85 A5, B5, W10, L2 W8, L2, N9	6.125 UI, R3, W8	8.325 A5, B5, W10, L2, N9, W10	5.875 W8	4.85 UI, J3, W8, A1	5.925 UI	6.85 UI, W8	7.25 UI	7.28 A5, K2, R3, N4, W7
	Cleveland, Ohio	5.075 R3	5.875 R3	6.85 A5, C13		8.325 A5, C13	7.425 R3	4.95 J3, R3	5.925 J3		7.25 J3, R3	7.28 A5, C13
	Detroit, Mich.	5.175 G3	5.425 G3	7.05 B5, P8 7.10 P3 6.85 R5	6.225 G3 6.125 R5	8.325 B5, P3, P8 8.325 R5	7.525 G3	4.95 G3		6.80 G3		
	Duluth, Minn.											7.28 A5
	Gary, Ind. Harbor, Crawfordsville, Ind.	5.075 UI, J3, Y1	5.075 UI, J3, Y1	6.85 R3, M5	6.125 UI, J3, Y1	8.325 R3, M4	7.425 UI, J3, Y1	4.85 UI, J3, Y1	5.925 J3	6.85 UI, Y1	7.25 UI, Y1	7.30 M4
	Granite City, Ill.							5.85 G2				
	Kokomo, Ind.											7.30 C9
	Sterling, Ill.	5.525 N4	5.175 N4									7.30 K2
	Niles, Warren, Ohio Sharon, Pa.			6.85 C10	6.125 C10, S1	8.325 C10	7.425 SI	4.85 SI, R3		6.85 SI	7.25 SI, R3	
	Pittsburgh, Pa. Midland, Pa.	5.075 UI, C11, J3	5.075 UI, J3	6.85 A5, C8, J3, R3, S9, B4, W10	6.125 UI, C11	8.325 A5, R3, S9, C8, W10, C11	7.425 UI, J3	4.85 UI, J3	5.925 UI	6.85 UI, J3	7.25 UI, J3	7.28 A5, J3, P6
	Portsmouth, Ohio											7.28 P7
	Weirton, Wheeling, Fellowsbee, W. Va.							4.85 W3				
	Youngstown, Ohio	5.075 UI, Y1, R3	5.075 UI, Y1, R3	6.85 UI, Y1, F2	6.125 UI, Y1	8.325 Y1, F2	7.425 UI, Y1	4.85 UI, Y1, R3		6.85 Y1	7.25 Y1	7.28 Y1
	Emeryville, Cal.	5.825 J5	5.825 J5									
	Fontana, Cal.	5.775 K1	5.775 K1		7.175 K1			8.125 K1	5.55 K1		7.55 K1	7.55 K1
	Genoa, Utah	5.175 C7						4.85 C7			7.25 C7	
	Kansas City, Mo.	5.325 S2	5.325 S2		6.375 S2		7.675 S2					7.45 S2
	Los Angeles, Torrance, Cal.	5.775 C7, B2	5.775 C7, B2	8.30 R3, P14	7.175 B2	10.10 P14	11.125 B2					8.15 B3
	Minneapolis, Colo.	5.525 C6	5.525 C6					5.70 C6				7.45 C6
	Portland, Ore.	5.825 O2	5.825 O2									
	San Francisco, Niles, Pittsburgh, Cal.	5.775 C7, P9 5.825 B2	5.775 C7, P9 5.825 B2				11.175 B2					8.15 C7, C6
	Seattle, Wash.	5.825 B2 5.825 N6	5.825 B2				11.175 B2	5.75 B2		7.75 B2	8.15 B2	
SOUTH	Atlanta, Ga.	5.575 A8										7.40 A8
	Fairfield, Ala. City, Birmingham, Ala.	5.075 T2, R3 5.375 C16	5.075 T2, R3 5.375 C16				7.425 T2	4.85 T2, R3			7.25 T2	7.28 T2, R3
	Houston, Ft. Worth, Lone Star, Tex.	5.325 S2	5.325 S2		6.375 S2		7.675 S2	4.95 S2 5.20 L3		6.85 S2	7.35 S2	7.45 S2

† Merchant Quality—Specialty Quality .35¢ higher.

# Steel Prices (Effective Dec. 25, 1956)

## Key to Steel Producers

### With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angell Nail & Chaplet Co., Cleveland
A7	Armen Steel Corp., Middlefield, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Pacific Coast Steel Corp., San Francisco
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C4	Claymont Products Dept., Claymont, Del.
C5	Cold Metals Products Co., Youngstown, O.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia-Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C12	Cumberland Steel Co., Cumberland, Md.
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C17	Chester Blast Furnace, Inc., Chester, Pa.
D1	Detroit Steel Corp., Detroit
D2	Dearborn Div., Sharon Steel Corp.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
D5	Henry Distress Div., Philadelphia
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire Steel Co., Manfield, O.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown

F3	Follansbee Steel Corp., Follansbee, W. Va.
G1	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., Chicago
I3	Inland Steel Co., Chicago
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Cal.
K2	Keystone Steel & Wire Co., Poria
K3	Koppers Co., Granite City, Ill.
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5	Monarch Steel Div., Hammond, Ind.
M6	Mystic Iron Works, Everett, Mass.
M7	Milton Steel Products Div., Milton, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N3	Niles Rolling Mill Div., Niles, O.
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Northeastern Steel Corp., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Olive Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Iron & Steel Co., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P5	Pittsburgh Screw & Bolt Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
R1	Reeves Steel & Mfg. Co., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Rotary Electric Steel Co., Detroit
R6	Rodney Metals Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon, Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S6	Standard Forging Corp., Chicago
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Corp., Carnegie, Pa.
S10	Seneca Steel Service, Buffalo
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheeland Tube Co., Wheeland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

Basis discounts (per cent) f.o.b. mills. Basis price about \$200 per ton.

STANDARD T. & C.	BUTTWELD												SEAMLESS											
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.			
	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.	Bil.	Gal.
Sparrows Pt. B3	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	21.50	5.00	22.00	5.00	22.50	5.00	23.00	5.00	23.50	5.00
Youngstown R3	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Fantana K1	9.00	+15.25	3.00	+12.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75	11.00	+5.00	11.50	+5.25	12.00	+5.50	12.50	+5.75	13.00	+6.00
Pittsburgh J3	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Alton, Ill. L1	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	21.50	5.00	22.00	5.00	22.50	5.00	23.00	5.00	23.50	5.00
Sharon M3	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Fairless N2	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	21.50	5.00	22.00	5.00	22.50	5.00	23.00	5.00	23.50	5.00
Pittsburgh N1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Wheeling W5	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Wheeland W4	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Youngstown Y1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
Indiana Harbor Y1	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	21.00	5.75	21.50	6.00	22.00	5.75	22.50	6.00	23.00	6.00	23.50	6.00
Lorain N2	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	22.00	6.75	22.50	7.00	23.00	7.00	23.50	7.00	24.00	7.00	24.50	7.00
EXTRA STRONG PLAIN ENDS																								
Sparrows Pt. B3	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	23.50	8.00	24.00	8.25	24.50	8.50	25.00	8.75	25.50	9.00
Youngstown R3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Fairless N2	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	23.50	8.00	24.00	8.25	24.50	8.50	25.00	8.75	25.50	9.00
Fantana K1	4.50	8.50	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	
Pittsburgh J3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Alton, Ill. L1	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	23.50	8.00	24.00	8.25	24.50	8.50	25.00	8.75	25.50	9.00
Sharon M3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Pittsburgh N1	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Wheeling W5	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Wheeland W4	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Youngstown Y1	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00
Indiana Harbor Y1	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	24.00	8.75	24.50	9.00	25.00	9.25	25.50	9.50	26.00	9.75	26.50	10.00
Lorain N2	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	25.50	10.00	26.00	10.25	26.50	10.50	27.00	10.75	27.50	11.00

Threads only, buttweld and seamless 2 1/4 in. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5 1/2 in. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 3 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 16¢ to 18¢ would increase discounts. East St. Louis zinc price new 13.50¢ per lb.



(Effective Dec. 26, 1956)

## RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer U.I.	5.075	6.00	6.35				
Se. Chicago R3.			6.775				
Ensley T3.	5.075	6.00					
Fairfield T3.	6.00		6.775		6.025		
Gary U.I.	5.075	6.00					
Ind. Harbor I3.	5.075		6.35	6.775		6.025	
Ind. Harbor VI							
Johnstown B3.		6.00					
Joint U.I.	5.075		6.35				
Kansas City S2				6.775			
Lackawanna B3	5.075	6.00	6.35			6.025	
Lebanon B3.							13.10
Minneapolis C6.	5.075	6.50	6.35	6.775		6.025	13.10
Pittsburgh P5.					6.775	12.85	
Pittsburgh J3.					6.775		13.10
Seattle B2.				9.275		6.175	13.16
Steeltown B3.	5.075		6.35			6.025	13.10
Struthers V1.				6.775			
Terrence C7.							
Williamsport S3	6.15			6.775			
Youngstown R3.							

## COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsburg, Pa.	\$15.25 to \$15.75
Foundry, beehive (f.o.b. oven)	
	\$18.00 to \$19.00
Foundry oven coke	
Buffalo, del'd	\$30.75
Detroit, f.o.b.	29.50
New England, del'd	30.55
Seaboard, N. J., f.o.b.	28.75
Philadelphia, f.o.b.	28.50
Swedesland, Pa., f.o.b.	28.50
Painesville, Ohio, f.o.b.	29.50
Erie, Pa., f.o.b.	29.50
Cleveland, del'd	31.55
Cincinnati, del'd	28.55
St. Paul, f.o.b.	28.50
St. Louis, f.o.b.	30.50
Birmingham, f.o.b.	27.60
Milwaukee, f.o.b.	29.50
Lone Star, f.o.b.	25.50

## ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.50
10	66	26.50	17	72	11.40
8	48	27.00	14	72	11.85
6	60	26.75	12	60	12.95
4	40	33.25	8	60	13.80
3	40	35.25			
2 1/2	38	37.25			
2	24	57.75			

\*Prices shown cover carbon nipples.

## ELECTROPLATING SUPPLIES

### Anodes

(Cents per lb, f.o.b. shipping point)

Copper	
Cast elliptical, 18 in. or longer, 5,000 lb lots	57.43
Electro-deposited	45.28
Brass, 80-20, ball anodes, 2,000 lb or more	58.00
Zinc, ball anodes, 2,000 lb lots (for elliptical add 2¢ per lb)	21.25
Nickel, 99 pct plus, rolled carbon, 90.50 (rolled depolarized add 3¢ per lb)	
Cadmium, 99.50, 1.70	
Tin, ball anodes and elliptical \$1.10 to \$1.16	
Chemicals	
(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	80.50
Copper sulphate, 5 or more 100 lb bags, per cwt	20.65
Nickel salts, single, 100 lb bags	85.25
Nickel chloride, freight allowed, 300 lb	43.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	21.65
(Philadelphia price 21.80)	
Zinc cyanide, 100 to 900 lb	65.65
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	29.25

## BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb	40,000 Lb
1/2" and smaller x 6" and shorter	55	55 1/2	60 1/2	61 1/2
1/2" thru 1" x longer than 6"	40 1/2	50	52 1/2	54
Rolled thread carriage bolts 1/2" in. & smaller x 6" in. and shorter	55	55 1/2	60 1/2	61 1/2
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6"	47	50	52	53
Flow bolts, 1/2" and smaller x 6" and shorter	54	57 1/2	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
1/4" in. or smaller	63
1/4" in. to 1 1/4" in. inclusive	59 1/2
1 1/4" in. to 1 1/2" in. inclusive	64
1 1/2" in. and larger	68

C.P. Hex regular & hvy.
1/4" in. and smaller
1/4" in. to 1 1/4" in. inclusive
1 1/4" in. and larger

Hot Galv. Nuts (All Types)
1/4" and smaller
1/4" and larger
1/2" and smaller
1/2" and larger

(Add 25 pct for broken case or keg quantities)

Finished

1" and smaller

Rivets	Base per 100 lb
1/4" in. and larger	\$10.85
7/16" in. and smaller	26 1/2

Pot Off List

Cap Screws

Discount (Packages)  
Bright Treated H. C. Heat

New std. hex head, packed	
1/4" diam. and smaller x 6" and shorter	47 34
1/4" diam. and 1" diam. x 6" and shorter	31 18
1/4" diam. and smaller x 6" longer than 6"	18 1/2 + 1
1/4" diam. and 1" diam. & longer than 6"	5 1/2 + 1 1/2

C-1018 Steel  
Full-Finished  
Cartons Bulk

1/4" through 1" dia. x 6" and shorter

1/4" through 1" dia. x 6" and shorter

Minimum quantity 1/4" through 1" diam., 15,000 pieces; 1/16" through 1/4" diam., 5,000 pieces; 1/4" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Discount

Mach. Stove Bolts

Plain Finish

Cartons

Bulk

Quantity

To 1/4" diam.

15,000-200,000 9 54

5/16 to 1" diam.

15,000-100,000 9 54

All diam. over 1"

5,000-100,000 — 54

long

Machine Screw & Stove Bolt Nuts

Discount

Hex Square

In cartons

Quantity

16 19

In Bulk

Quantity

15,000-100,000 7 9

1/4" diam. & smaller

15,000-100,000 7 9

## CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.4
Chicago	133.4
San Francisco-L. A.	140.2
Dec. 1965 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1965 issue.	
Source: U. S. Pipe and Foundry Co.	

## REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$28.00
No. 1 Ohio	28.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$2.00)	20.00

Source: U. S. Pipe and Foundry Co.

Super Duty

Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville

150.00-157.00

Silica cement, net ton, bulk, Latrobe

26.50

Silica cement, net ton, bulk, Chicago

24.00

Silica cement, net tons, bulk, Emsley, Ala.

25.50

Silica cement, net ton, bulk, Mt. Union

23.00

Silica cement, net ton, bulk, Utah and Calif.

15.00

## Chrome Brick

Per net ton

Standard chemically bonded, Balt. \$98.00

Standard chemically bonded, Curtin, Calif. 108.00

Burned, Balt. 92.00

Source: U. S. Pipe and Foundry Co.

## Magnesite Brick

Standard, Baltimore \$121.00

Chemically bonded, Baltimore 109.00

Source: U. S. Pipe and Foundry Co.

## Grain Magnesite

St. % to 1/4-in. grains

Domestic, f.o.b. Baltimore in bulk. \$69.40

Domestic, f.o.b. Chewelah, Wash. 56.00

Luning, Nev. 43.00

in bulk 49.00

in sacks

Source: U. S. Pipe and Foundry Co.

## DEAD BURNED DOLOMITE

Per net ton

F.o.b. bulk, producing points in:

Pa., W. Va., Ohio 16.00

Midwest 16.35

Missouri Valley 16.00

Source: U. S. Pipe and Foundry Co.

## METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, f.o.b. Riverton, N. J., ocean bags 8.50¢

De'l'd in East, carloads 9.5¢

Domestic sponge iron, 98% Fe, carloads lots 8.5¢

Electrolytic iron, annealed, imported 99.5% Fe 27.5¢

domestic 99.5% Fe 36.5¢

Electrolytic iron, unannealed minus 225 mesh, 99.4% Fe 57.00¢

Electrolytic iron melting stock, 99.84% Fe 22.00¢

Carbonyl iron size 5 to 10 micron, 98%, 99.84% Fe 86.0¢ to \$1.55

Aluminum freight allowed.

Brass, 10 ton lots 37.50¢ to \$6.00

Copper, electrolytic 49.75¢

Cadmium, 100-199 lb, 95% plus metal value

Chromium, electrolytic 99.85% min. Fe .03 max. Del'd .50¢

Lead .00¢ plus metal value

Manganese .70¢

Molybdenum, 99% .35¢ plus met. value</p

## Ferroalloy Prices

(Effective Dec. 26, 1956)

### Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd.	67-71%
Cr, 30-1.00% max. Si.	
0.02% C	41.50
0.03% C	41.00
0.06% C	39.50
0.10% C	39.00
0.15% C	38.75
4.00-4.50% C	67.70% Cr, 1-2% Si.
3.50-5.00% C	57.64% Cr, 2.00-4.50% Si
0.025% C (Simplex)	34.75
0.10% C, 50-52% Cr, 2% max. Si.	35.75
0.50% max. C, 50-55% Cr, 3-6% Si.	24.00
8.50% C, 50-55% Cr, 3% max. Si.	24.00

### High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

### Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe.	1.40

### Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads	\$1.29
Ton lots	1.31
Less ton lots	1.33

### Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.)	
Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.	
Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

### Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.	
30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

### Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

### SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.	
Ton lots	20.15
Less ton lots	21.40

### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

### Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 76 pct. Mn.	
Producing Point per-lb	
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	11.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	11.75
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk	14.80
Ton lots packed	17.20

### Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$97.50
19 to 21% 3% max.	99.50
21 to 23% 3% max.	102.00

### Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.75
Ton lots	47.25

### Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads	33.00
Ton lots	35.00
25 to 199 lb	37.00
Premium for hydrogen-removed metal	0.75

### Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn.

25.50

### Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95
0.07% max. C	35.10	37.90
0.10% max. C	34.35	37.15
0.15% max. C	33.60	36.40
0.30% max. C	32.10	34.90
0.50% max. C	31.60	34.40
0.75% max. C, 80.85% Si	28.60	\$1.40

### Silicromanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk

Ton lots

Briquet contract basis carloads, bulk, delivered, per lb of briquet

Ton lots, packed

17.50

### Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.

### Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

Ton lots	Carloads
96.50% Si, 2% Fe	23.95
98% Si, 0.75% Fe	24.45

### Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk

Ton lots, packed

10.50

### Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si

65% Si

90% Si

75% Si

16.80

18.50

19.90

10.50

### Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

Cast Turnings Distilled

Ton lots

\$2.05

\$2.95

\$3.75

Less ton lots

2.40

3.30

4.55

High speed steel (Primos)

3.40

### Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads

10.65¢

Ton lots

11.80¢

### Calcium molybdate, 43.6-46.6%

f.o.b. Langloch, Pa., per pound contained Mo.

\$1.28

### Ferrocolumbium, 50-50%, 2 in. x D

Contract basis, delivered per pound contained Cb.

Ton lots

\$6.90

Less ton lots

6.95

### Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Sb plus Ta.

\$4.95

### Ferromolybdenum, 55-75%, 200-lb

containers, f.o.b. Langloch, Pa., per pound contained Mo.

\$1.54

### Ferrophosphorus, electric, 23-

26%, car lots, f.o.b. Siglo, Mt.

Pleasant, Tenn., \$4.00 unitage,

per gross ton

\$90.00

10 tons to less carload

\$110.00

### Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.

\$1.35

### Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.

\$1.50

Less ton lots

\$1.56

### Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton

\$215.00

### Ferrotungsten, 1/4 x down, packed, per pounds contained W.

ton lots delivered

\$33.15

### Molybdc oxide, briquets, per lb

contained Mo, f.o.b. Langloch, Pa., bags, f.o.b. Washington, Pa., Langloch, Pa.

\$1.32

Less ton lots

\$1.30

### Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump

18.50¢

Ton lots, packed lump

20.50¢

Less ton lots

21.00¢

### Vanadium oxide, 86-89% V<sub>2</sub>O<sub>5</sub>

contract basis, per pound contained V<sub>2</sub>O<sub>5</sub>

\$1.38

### Zirconium contract basis, per lb

of alloy

25-40% f.o.b. freight allowed,

carloads, packed

27.25¢

12-15% del'd lump, bulk-carloads

9.25¢

### Boron Agents

#### Borosil, contract prices per lb of

alloy del'd, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-

45%, per lb contained B

2000 lb up

\$5.50

#### Bortam, f.o.b. Niagara Falls, Ton lots, per pound

45¢

Less ton lots, per pound

50¢

#### Corbortam, Ti 15-21%, B 1-2%,

Si 2-4%, Al 1-2%, C 4-5.75%

</div

# RAILWAY EQUIPMENT FOR SALE

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All Types

## SERVICE-TESTED® FREIGHT CAR REPAIR PARTS

For All Types of Cars

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## THE CLEARING HOUSE

### News of Used and Rebuilt Machinery

**Do-It-Yourself . . .** The urge to "go in business for myself" is continuing unabated among metal-workers in Cleveland and used machinery firms are helping many a neophyte get under way. Original investments are as little as \$1000 and one of the largest dealers in Cleveland has had no repossessions. Many have developed into fair sized businesses and many a former drill press operator now has his own Coupe de Ville. For some dealers it represents up to 10-15 pct of the business.

**One Out of Ten . . .** A large Cleveland firm says that about two or three shop workers a week come in to talk about setting up a shop of their own. For every 10 that come in about one eventually gets going with machinery from their firm. Prospects generally are workers who have inherited some money or saved it up.

Many are planning to simply start out and solicit business but others can do some subcontracting of small parts manufacturing from their regular employer. A good many inquiries come in by mail from the general midwest area, mostly from people seeking specific types of machinery.

**Here's the Setup . . .** Typical setup of equipment generally involves a used lathe, shaper and drill press with total value of about \$2500 to \$3000. Some of these business operators have installed them in their garages or leased quarters.

Financial arrangements vary considerably. Some larger used machinery dealers do their own financing after conscientious screening.

**Money Matters . . .** Most dealers send the customer to banks or regular commercial credit firms. The general arrangement on a typical \$3000 deal is \$1000 (one third) down and the balance in a year at 6 pct interest.

"Probably almost every shop worker in town has had the idea at one time or the other to go in business for himself," one machinery dealer said last week. "Most of the determined ones with good enough background can make a go of it."

**Up Ten Pct Plus . . .** Cleveland dealers generally did about 10 to 15 pct increased business in 1956 compared to 1955. Biggest problem continued to be locating good used machinery items. And there is little indication of any abatement in 1957.

Many dealers figure the surplus sources have been pretty much dried up. Most dealers will not venture more than a day's journey from home to look at any one machine because freight and rehabilitation eat up profit margins. Items most in demand continue to be regular toolroom equipment and large machine tools.

**And at Pittsburgh . . .** A year-end lag in sales doesn't seem to be greatly alarming dealers. It is felt that the condition is normal for this period of the year and in reality there's been no basic overall change in the used machine situation.



# CONSIDER GOOD USED EQUIPMENT FIRST

## BENDING ROLLS

6" x 2 1/8" Niagara Initial Type  
8" x 1 1/2" Webb 120-V Vertical  
10" x 1 1/2" Berthel Initial Type  
10" x 1 1/2" King Pyramid Type  
12" x 1 1/2" Southwark Pyramid Type  
12" x 1 1/2" Southwark Pyramid Type  
20" x 1" Hilles & Jones Pyramid Type  
30" x 1 1/2" Niles Pyramid Type

## BRAKES—LEAF TYPE

8" x 3/16" Dreis & Krump

12" x 1 1/2" Dreis & Krump

12" x 1 1/2" Dreis & Krump

## BRAKES—PRESS TYPE

10" x 1 1/2" Superior Hydraulico—NEW

10" x 1 1/2" Superior Hydraulico—NEW

12" x 1 1/2" Superior Hydraulico—NEW

## CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Whiting 48" Span 230/3/60 A.C.  
5 ton Span 230 Volt D.C.  
10 ton 5' H. 230 Volt D.C.  
10 ton Cyclops 40" Span 230/440 A.C.  
10 ton Cleveland 47" Span 440/3/60 A.C.  
15 ton P&H 48" Span 230 Volt D.C.  
15 ton P&H 75" Span 230 Volt D.C.  
25 ton L. 75" Span 230/3/60 A.C.  
Incl. 300 ft. Runway

80 ton Niles 75" Span 230 Volt D.C.

120 ton Niles 68" Span 440/3/60 A.C.

## FORGING MACHINES

1" to 5" Acme, Ajax, National

3" Acme Model XN, Air Clutch, NEW 1954

## HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—600 lb. to 20,000 lb.

## LEVELLERS—ROLLER

48" Kane & Roach 17 Rolls 4" O.D.  
54" Astoria Standard 17 Rolls 3 1/2" Dia.  
72" McKay 17 Rolls 4 1/4" Dia.  
Budd-McKay Sheet Processing Machine & Roller Lever, 15 Rolls 72" x 4 1/4" Dia.

## PRESSES—HYDRAULIC

500 ton Elmes 18" Stroke Lower Plates 35" x 66"  
750 ton Baldwin Triple Acting Bolster 84 x 133"  
1200 ton United Steam Hydraulic Forging Press  
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

## PRESSES—HYDRAULIC WHEEL

600 ton N-B-P, 90° Between Strain Bars

800 ton N-B-P, 90° Between Strain Bars

## PRESSES—STRAIGHT SIDE

Cleveland IT-48 Double Acting, 20" Stroke of Bids  
14" Stroke of Blankholder, Bolster 48x18"  
250 ton Blas 20" Stroke, Bolster 30" x 30"  
190 ton Toledo 54A, 14" Stroke, Bolster 38" x 38"  
170 ton Blas 57", 14" Stroke, Bolster 32" x 32"  
150 ton Toledo 3 1/2" x 50", 6" Stroke, Bolster 38" x 38"  
105 ton Blas 56", 5 1/2" Stroke, Bolster 25" x 25"

## PUNCH & SHEAR COMBINATIONS

ME-10 Pels Ironworker, Capacity Punch 1/2" x 1/2".  
Shear 1 1/2" Rd., 1 1/2" Sq. 3 x 3 x 1/2" Angles  
#44 x 48 Buffalo RAP, Capacity 1 1/2" x 1/2"  
Cleveland Style G Single End, 60" Throat

#10 Kiling, 45" Throat, Punch 2" thru 1"

No. 14 Buffalo Universal Ironworker

## ROLLS—FORMING

Model 14 L-M-1 Tishken Roll Forming Machine  
1 1/2" Dia. Spindle, 3 1/2" Capacity, With Cut-Off

## ROLLS—PLATE STRAIGHTENING

72" Berthel Seven Rolls, 7" Dia.

86" H & J Six Rolls 10" Dia.

12" Newbold, Nine Rolls 14" Dia.

## ROLLING MILLS

12" Three High Bar Mill

18" Two High Bar Mill

10" x 16" Single Stand, Two High

12" x 14" Two High Strip Mill

12" x 16" Phila. Single Stand, Two High

16" x 24" Farrell Two Stand, Two High

20" x 34" United Single Stand, Two High

24" x 40" Three High Rolling

44" x 144" Three High Sheet Mill

22" x 40" Three High Sheet Mill

## SHEAR—GATE

90" x 1 1/2" Batty

## SHEARS—SQUARING

6" x 10 Ga. Niagara No. 673

8" x 3 1/2" Cincinnati—NEW 1953

10" x 3 1/2" Niagara No. 910—NEW 1951

## SHEARS—WEAN

12" Blake & Johnson

36" Wean Slitting Line

32" Stamps Slitting Line

## SWAGING MACHINE

36" F. M. F. Capacity 2 1/4" Tube, 3/4" Solid 10"

Die Length, Hydraulic Feed, LATE

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60,000, 100,000, 200,000 Olsen & Riehle Universal

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No. 6 Abrasive 12" x 60" surface grinder.  
72" Hammett 3-spd. rotary surface, new 1948.  
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.  
10" x 74" Head hyd. pl. Internat. X-sliding H. S., 1942.  
18" x 36" Landis type C hyd. pl. cylindrical, 1942.  
8" x 30" Cincinnati EA Filomatic pl. cylindrical, 1942.

### HAMMERS

No. 30 Chambersburg pneumatic, serial No. 2327.  
No. 6-1 Nazel, pneumatic, late.  
No. 6-2 Nazel, self-contained.

### LATHES

No. 3 Gisholt Univ. Turret Lathes (2), 1942.  
No. 5 Gisholt ram type Univ. Turret Lathes, 1940.  
14" x 6" Hendey Toolroom, 1940.  
18" x 30" Lipe Carbo-Matic, 1942.  
50" x 42" Bullard New Era vertical turret lathe,  
130" x 40" CC Niles Bement Pend engine lathe, 80  
HP, M.D.

### MILLING MACHINES

No. 2 Brown & Sharpe vertical mill, new 1943.  
No. 4 Cincinnati high power plain horizontal mill,  
model E 1945.  
No. 5-48 Cincinnati hydromatic duplex mill, serial  
No. 2-24 Cincinnati automatic simplex mill, serial  
No. 1BSPIT-1.

### PRESSES

80 ton No. 82/2 D Toledo D.C. Str. Bids.  
200 ton No. 7-72 Blas 8.9, D.C. Press, Air Clutch.  
200 ton No. 195-72 Toledo D.C., Toggle drawing.  
250 ton Elmes self-cont. 4 post Hydraulic Press, 1944.  
300 ton No. 1053 Hamilton D.C. adj. head, 60" x 102".  
300 ton No. 8 National Maxipress Forging Press.

### SHAPERS & SLOTTERS

24" Gould & Eberhardt Universal.  
32" G & E Invincible, F.M.D.  
36" Rockford hyd. vertical slotter, new 1944.

### UPSETTERS

1 1/2" National Upsetter, guided ram, hard ways.  
3 1/2" Ajax suspended slides, steel frame.

National high duty, susp. & guided rams.

7 1/2" National Upsetter, air clutch, new 1944.

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TUBE BENDER HYD. W&W 1 1/4" x 16" MP, AC  
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4" National Upsetter High Duty, guided over-arm slide, air clutch

Ajax & National Upsetters, suspended slide,  
2 1/2", 3", 4", similar upsetters not suspended  
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70-ton Ajax High Speed Forging Press

50,000# Standard Double Draw Bench

#3 Abramson Bar & Tube Straightener

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1600 Chambersburg Model F Board Drop Hammers, Roller bearing; double V-ways, Built 1943

1500 lb. Niles Steam Forging Hammer

Bradley Hammers, various sizes, including

500# Upright

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Machines from 3/4" to 4"

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1 100 570 G.E. MD-562 220/440

1 100 870 Whse. CW 220/440

1 100 1160 Whse. EDX612 220/440

1 100 435 Whse. CW 220/440

1 150 490 Whse. CW 220/440

1 150 585 Whse. CW 4180/2300

1 200 705 Al. Ch. ANY 220/440

1 200 498 G.E. IM-14 220

1 200 538 G.E. IM-16 220

1 200 1760 G.E. IM-12B 220

1 250 300 G.E. MT-414 220

1 250 705 Al. Ch. ANY 220/440

1 350 450 G.E. MT-412 220

1 400 290 Whse. CW 220

1 400 565 G.E. CW 220

2 500 545 Al. Ch. ANY 220

1 700 295 Whse. CW 220

1 750 400 G.E. IM 220

1 1000 445 Whse. CW 220

1 1500 360 Whse. Mill type 220

1 1500 270 Whse. Mill type 6600/4000

2 2500 237 G.E. Mill type 220

2 2500 360 Al. Ch. 1.0 PF 440/2300/4

1 150 900 G.E. ATI 220

1 150 720 El. Mch. .8 PF 220/440

1 150 660 G.E. TS 7641 550

1 150 900 G.E. TS 963 4000/4800/2400

1 125 900 G.E. Mch. 1.0 PF 4800/2400

2 100 1800 Whse. TS 7556 220

1 100 900 Ideal .8 PF 220/440

2 100 600 G.E. TS 7641 220/440

1 100 360 El. Mch. 1.0 PF 220/440

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TIoga, Livingston & Almond Sts.

PHILADELPHIA 34, PA. Phone GARFIELD 3-8700

## FOR SALE GOOD CONDITION

2-B & W Fire Tube Waste Heat Boilers, set single. With superheaters, induced draft fans, and soot blowers. 7797 sq. ft. heating surface each unit. 250 p.s.i. design pressure. 200 p.s.i. operating pressure at superheater outlet. 450 deg. F. total temperature. 15,000 lbs. capacity steam/hr. Boilers certified annually for operation at a pressure not to exceed 250 lbs. per sq. in. Scheduled for release January, 1957. Inspect now.

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Phone: MADison 6-8211, Extension 33

### USED STEEL MILL EQUIPMENT FOR SALE

1—Striene Automatic Sheet Mill Pack Shear, complete unit.  
1—Long and Allstatter Billet Shear, 24" blade, Model S, Cap. 6" rd.  
1—#31 Beatty Plate Shear, 3/4" x 96" cap.  
1—48" x 1/2" Covington Squaring Shear with 12" gap.

*Lou J. Kinderman*

Box 182 - Niles, Ohio • Phone OL 2-9876



GREENPOINT IRON & PIPE CO., INC.  
Bogart, Stegg & Meadow Sts.  
Brooklyn, N.Y.

December 27, 1956

## Eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

### SURFACE GRINDERS

10 x 36" Cincinnati Hydraulic, m.d.  
10 x 36" Norton Type C, m.d.  
10 x 72" Landis, m.d.  
12 x 36" Landis Plain Self-Contained, m.d.  
12 x 96" Landis Plain Self-Contained, m.d.  
14 x 52" Norton, motorized  
16 x 72" Landis Plain, m.d.  
16 x 72" centers Type C Norton Semi-Auto., Hydraulic  
16 x 96" Cincinnati Plain Cylindrical, m.d.  
16" raised to 20" size 72" centers Norton, Type C, m.d.  
18" x 72" Norton Type C, mechanical m.d.  
20" x 120" Landis Plain Self-Contained, m.d.

### UNIVERSAL GRINDERS

No. 2 Brown & Sharpe, 14" x 30" centers cap., m.d.  
No. 3 Brown & Sharpe, 14" x 30" centers cap., m.d.  
10 x 24" Landis Type C, m.d.  
12 x 48" Norton Universal, m.d., latest  
14 x 48" Landis Universal  
18 x 66" Landis Universal, m.d., Type C

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

## THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio

MElrose 1241

CABLE ADDRESS—EMCO

## Pyramid Bending Rolls

All Drop End—Complete  
8' x 1/2"  
18' x 3/4"  
20' x 1"

KINGS COUNTY MACH'Y. EXCH.  
408 Atlantic Ave. B'klyn 17, N. Y.  
Triangle 5-5213

## FOR SALE OR RENT

1—25 Ton Bay City Truck Crane  
1—45 ton G.E. Diesel Electric Locomotive  
1—115 ton Baldwin Diesel Electric Locomotive  
1—25 ton American Diesel Locomotive Crane  
1—50 ton American Diesel Locomotive Crane

**B. M. WEISS COMPANY**  
Girard Trust Bldg. Philadelphia 2, Pa.

### Overhead Cranes & Hoists

New and Used  
250-ton Shaw, 60' span, 230 VDC, 2—125-ton trolleys  
180-ton Shaw, 65' 0" span, 2—90-ton trolleys, 230 VDC  
125-ton Alliance Ladle, 60' span, 25-ton aux, 230 VDC  
120-ton Morgan, 65' span, 2—60-ton trolleys, 230 VDC  
90-ton Northern, 10-ton aux, 55 1/2" span, 440/VAC  
25-30-ton Weilman Eng'r, 5-ton aux, 60' span, 230 VDC  
15-ton Northern, 72' span, 230 VDC, 60' 59" AC  
7 1/2-ton Shaw, 65'-10" span, 220/3/60  
2 7/8-ton Shaw, 47' span, 230 VDC  
1—10-ton Shaw, 36' span, 230 VDC with 100-ft. outside runway  
10-ton Modena 37'-0" span, 220/3/60  
1—15-ton & H. 51 1/2" span, 230 VDC  
14-ton Morgan, 60' span, 3-ton aux, 230 VDC  
1—5-ton Toledo, 60' span, 230 VDC  
100 other cranes, various spans and current.

**JAMES P. ARMEL, Crane Specialist**  
710 House Bldg. Pittsburgh 22, Pa.  
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## TOTAL OF 17,500-KW IN M.G. SETS

5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets, Each consisting of:  
2—1750-KW, 250/350 Volts, parallel, 500/700 Volts series, 514 RPM, 5000 Amp., type HCC, rated continuous at 40 Deg. C Allis-Chalmers DC Generators with Class B insulation, separately excited, direct connected in the center to:  
1—5000-HP, 1730-KW, 13800 Volts (6900 Volts), 3 Phase, 60 cycle, 514 RPM, 162 Amps. Allis-Chalmers, Synchronous Motor with Class B insulation, rated continuous at 40 Deg. C. Rise. Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM. All mounted on a structural steel base approximately 27' long x 11' wide. These Units are of the very latest type and design—condition excellent—were used only a short time—AC and DC Switchgear available. For any additional information and price, please contact one of the following dealers closest to you:

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Moorhead Electrical Machinery Co.  
120 Noblestone Road, Oakdale (Pittsburgh District), Pennsylvania  
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P. O. Box 9114, Houston, Texas  
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## ELECTRON DRILL

ELOX M-400D

Never used, except for trial. Will sell well below original purchase price.

**CHARLES MUNDT & SONS**  
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DElaware 3-6200

BSA 1/2" & 1 1/4" Automatics, 1954.  
Gleason 3" Str. Bevel Gear Generator.  
Hardinge Nos. 57 & 59 2nd-oper. Lathes.  
Fellows No. 4 Gear Shavers.

**D. E. DONY MACHINERY CO.**  
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### SQUIRREL CAGE MOTORS

H.P.	MAKE	TYPE	SPED
1250	ALCh. (5)	ANX	3600
1200	ALCh.	ARW	1200
750	Westg.	CS	900
500	ALCh.	ARW	3600
400	G.E.	KT-5695	900
350	G.E.	KT-1724	450
350	G.E.	KT-550A	1800
250	G.E. (2)	CG-81205 TEFO	1800
250	G.E.	KT-550	1800
250	G.E. (2)	OEX-148	720
250	G.E.	IK	600
250	G.E.	IK-17A	900
250	G.E.	CG-81205	514
200	G.E.	FT-549Y	3600
200	G.E.	IK-15H	1800
200	G.E.	KT-584	900
200	Westg.	CG-830A	900
200	G.E. (2)	KT-5645	720
200	ALCh.	ARWWT	900

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### LIKE NEW

RECIRCULATING PIT DRAW FURNACE  
Lindberg Type 4340E-16 Temp. 1600°F. 3 sets of  
43 Dia. x 48 Deep Work Baskets. Power De-  
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Phone Twisbrook 2-9400

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Morgan Eng. 88" x 1 1/4" Capacity, 24" Gap;  
Guillotine Type. Equipped with Built-in Scrap  
Shear. 30 Hp. AC Motor Drive. Wt. Approx.  
80,000 Lbs.

ACE EQUIPMENT CO.  
141 N. Third St. Philadelphia 6, Pa.

### EQUIPMENT AND MATERIALS WANTED

**WANTED**  
**NEW SURPLUS STEEL USED**  
Structural, Plate, Pipe and Tubing  
*Consumers Steel & Supply Co.*  
P. O. BOX 270, RACINE, WISCONSIN

**WEISS STEEL CO. INC.**  
600 WEST JACKSON BLVD.  
CHICAGO 6, ILLINOIS  
Buyers of Surplus Steel Inventories  
37 years of steel buying

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HIGH GRADE MEN—Salaries \$5,000 to \$25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comptrollers, Accountants, and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bourse, 20 W. Jackson Blvd., Chicago 4.

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BUYER-P.A.—Wanted by Steel Warehouse with several branches to order product. Managers—Requisitions—and to coordinate purchases and expedite deliveries. Advise experience and salary requirements. Address Box G-465, care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39.

#### HELP WANTED

CHIEF DESIGN ENGINEER—Mechanical Engineer degree preferred—Broad experience required for design of facilities for integrated steel plant located in Southwest. Excellent opportunity in a well established, fast expanding organization. Pension plan, group hospitalization, vacation, sick leave, etc. Submit complete personal and professional resume in first letter. Address Box G-460, care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39, Pa.

### FOR SALE

**FREIGHT CAR REPAIR PARTS**  
**RELAYING RAILS & ACCESSORIES**  
**STEEL STORAGE TANKS**  
**FRT. CARS & LOCOMOTIVES**  
**CONTRACTOR EQUIPT. &**  
**MACHINERY**

### THE PURDY CO.

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CHICAGO 19, ILL. — BA 1-2100  
ALSO ST. LOUIS, MO., SAN FRAN.  
AND LONG BEACH, CALIF.

## DAVIDSON PIPE COMPANY INC.

ONE OF THE LARGEST STOCKS IN THE EAST

Seamless and Welded 1/8" to 26" O.D.

All wall thickness manufactured.

Specialty large sizes.

Cutting — Threading — Flanging —

Fittings — Valves.

Call GEdney 9-8310

### DIESEL LOCOMOTIVES

#### 44 TON & 25 TON G. E. DIESEL ELEC.

#### STEEL SHEET PILING

215 TONS BETH. AP-3—29', 24', & 20'

177 TONS CARNEGIE M-118—31', 40', & 50'

300 TONS CARNEGIE MZ-27—40'

R. C. STANHOPE, INC.

New York 17, N. Y.

### New RAILS Relaying

We carry frogs, switches, spikes and bolts in stock and most all sections of rails and track accessories.

#### M. K. FRANK

400 Lexington Ave., New York, N. Y.  
Park Building, Pittsburgh, Pennsylvania  
105 Lake St., Reno, Nevada

### FOR SALE STEEL BUILDING

50'0" x 200'0" with 15 ton AC floor operated crane, mfd 1943, 25'3" under eaves, 20'0" c to c columns. Immediate delivery.

#### ORNITZ EQUIPMENT CORPORATION

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### WANTED

300 to 500 tons of 5" 6" and 8" block steel pipe lapweld or seamless

J. G. Piscitelli and Son  
Hudson Falls, New York  
Telephone 4-0000

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STEEL DISTRIBUTOR WAREHOUSE  
PLANT FOR CASH.

ADDRESS BOX G-456  
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### METALLURGIST

A long established manufacturer of drop forgings desires young graduate metallurgist, preferably with 3-5 years aircraft forging experience, primarily on ferrous metals. Reply stating age, educational background and experience, and salary requirements.

#### The Billings & Spencer Company

1 Laurel Street, Hartford, Conn.  
Attention — President

### Electrical Engineer

Steel Fabrication, Northeast Ohio. To reduce electrical down-time production, maintenance equipment to a minimum. Establish preventive electrical maintenance program.

ADDRESS BOX G-463  
Care *The Iron Age*, Chestnut & 56th Sts., Phila. 39

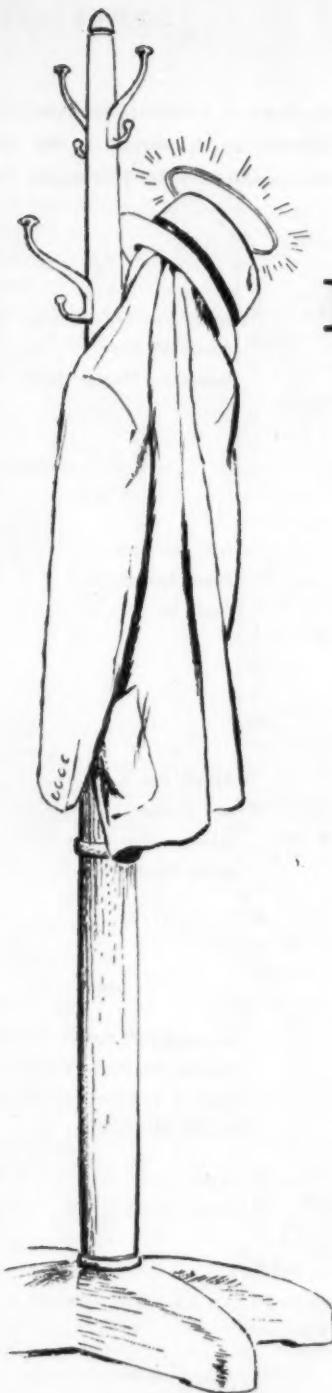
## INDUSTRIAL ENGINEERS

Multi-million dollar expansion of our operating facilities has created opportunities in industrial engineering for young men trained or experienced in wage incentive programming, methods engineering, and statistical quality control. 1 to 3 years experience will qualify. Professional status assured. Openings at our Fontana plant in Southern California.

Send complete resume to  
Employment Manager

#### KAISER STEEL CORP.

P. O. Box 217, Fontana, California



## How good is your advertising manager?

There is a quick way to find out—and it's also easy. Just make sure that your organization permits him to *manage* your advertising.

That may seem obvious, but many industrial companies have never taken time to define the functions of the advertising department. As a result, there is confusion. In many cases advertising gets to be little more than a service department, merely producing what other departments ask for.

Your advertising manager should be a full-time player on your marketing team. When sales objectives are set, it is his task to plan and carry out the advertising program which will give the most help in attaining those objectives.

That's what you hired him for. If he isn't permitted to do that, you are wasting his time and talents—and good men in other departments are wasting their time and talents trying to be advertising men.

**National Industrial Advertisers Association, Inc.**  
271 Madison Avenue, New York 16, New York

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.



## METALWORKING BRIEFS

## ADVERTISERS

### J&L Moves To Buy Rotary Electric

Purchase of Rotary Electric Steel Co., Detroit, by Jones & Laughlin Steel Corp. has been agreed upon by both managements and is pending approval of stockholders. Under the deal, J. & L. would exchange four of its common shares for each five shares of Rotary. Rotary Electric, which produces about 10 pct of all stainless steel in the U. S., would put J. & L. into the stainless steel business sooner than expected. J. & L.'s present capacity of 6.2 million tons annually consists of practically all carbon steel. The company announced earlier this year it was expecting to install stainless producing equipment at its Cleveland plant.

### Weirton and Phoenix Tap New Openhearts

Two steel companies tapped first heats from new open-hearth furnaces in the past week. Weirton Steel Co. drew metal from what is claimed to be the world's largest openhearth. It has a rated capacity of 600 tons per heat. Heat time is under 15 hrs. Phoenix Iron & Steel Co. tapped its new furnace at Harrisburg, Pa. It boosts capacity of the Barium Steel Co. subsidiary to 500,000 tons annually.

### RR Costs Offset Gains, Faricy Says

Increased operating expenses and taxes more than offset gains in operating revenues of Class I railroads in 1956, according to William T. Faricy, president of the Association of American Railroads. Net income was 5.6 pct less than in 1955, and the rate of return on net investment declined from 4.22 pct to 3.95 pct.

### GE Defers Lab Construction

Construction of two electric lamp research laboratories costing about \$5 million has been deferred by General Electric Lamp Div. in Cleveland pending "a careful re-evaluation of the expansion in light of the changing trend in the national economy." On one of the labs, a \$3 million job in suburban Richmond Heights, excavations are completed and part of the steelwork is in place. But work will continue uninterrupted on a third lab at Nela Park.

### Lake Ore Boats Anchored Until Spring

Old Man Winter put a quick stop to ore shippers' plans to stay at work into January. Pittsburgh Steamship Div. of U. S. Steel loaded its last cargoes for the year at Two Harbors, Minn., Dec. 19, in what was still the latest loading in division history. Total tonnage shipped, however, was behind last year due to strikes.

### New Entries In Tax-Am Derby

Bethlehem Steel Co. entered the tax amortization sweepstakes with three applications totaling \$269.5 million for new rolling mill, plate, and shipbuilding facilities. Requests are for improvements at Steelton, Pa., Lackawanna, Pa., and Quincy, Mass., shipyard. Meanwhile, Lone Star Steel Co., Lone Star, Tex., filed for tax aid for new tube mills costing \$7.8 million.

As asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

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\*Jones & Laughlin Steel Corporation 52

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Appears in first and third issue of each month.	
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more and more manufacturers are saying: "Let's use

# GRIFFIN® COLD ROLLED STRIP STEEL"

Made to your specifications in all thicknesses from .012 to .375 inches and widths from  $\frac{1}{2}$ " to 19" depending upon gauge.

## NARROW ROLLED ROUND EDGE STRIP STEEL In stock at

CENTRAL STEEL & WIRE CO.  
Detroit, Chicago, Cincinnati  
Wm. H. LIONORI & CO., Inc.  
New York City

**GRiffin**  
"since 1899"

MANUFACTURING CO. ERIE, PA.

New



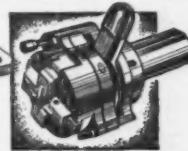
## ARMSTRONG T-SLOT CLAMPS

Make rigid set-ups in minutes on planers, drill presses, milling machines or other T-slotted beds or platens. Clamp slides or rotates to position on anchoring T-slot bolt. Drop forged, heat-treated body. Heat-treated screw has V-slotted swivel cap.

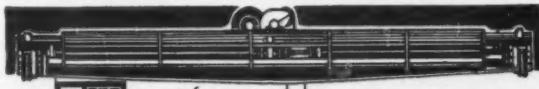
ARMSTRONG BROS. TOOL CO.  
"The Tool Holder People"  
5209 Armstrong Ave., Chicago 30, U.S.A.



**famous** for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.



THE EASTERN MACHINE SCREW CORP., 21-41 Barclay Street, New Haven, Conn. Pacific Coast Representatives: A. C. Behringer, Inc., 334 E. San Pedro St., Los Angeles, California. Canada: F. P. Barber Machinery Co., Toronto, Ontario, Canada



*To Lower your Overhead...*

**BROWNING ELECTRIC**  
TRAVELING CRANES AND HOISTS  
up to 125-TON CAPACITY

VICTOR R. BROWNING & CO., INC. WILLIAMSBURG (Cleveland), OHIO

**WIRE—STRIP, COILED  
FOR ELECTRIC FUSE  
ELEMENTS  
EYELETS ALSO BRASS OR STEEL**

**Zinc**

THE PLATT BROS. & CO., WATERBURY, CONN.

## GOSS and DE LEEUW

MULTIPLE SPINDLE  
CHUCKING MACHINES

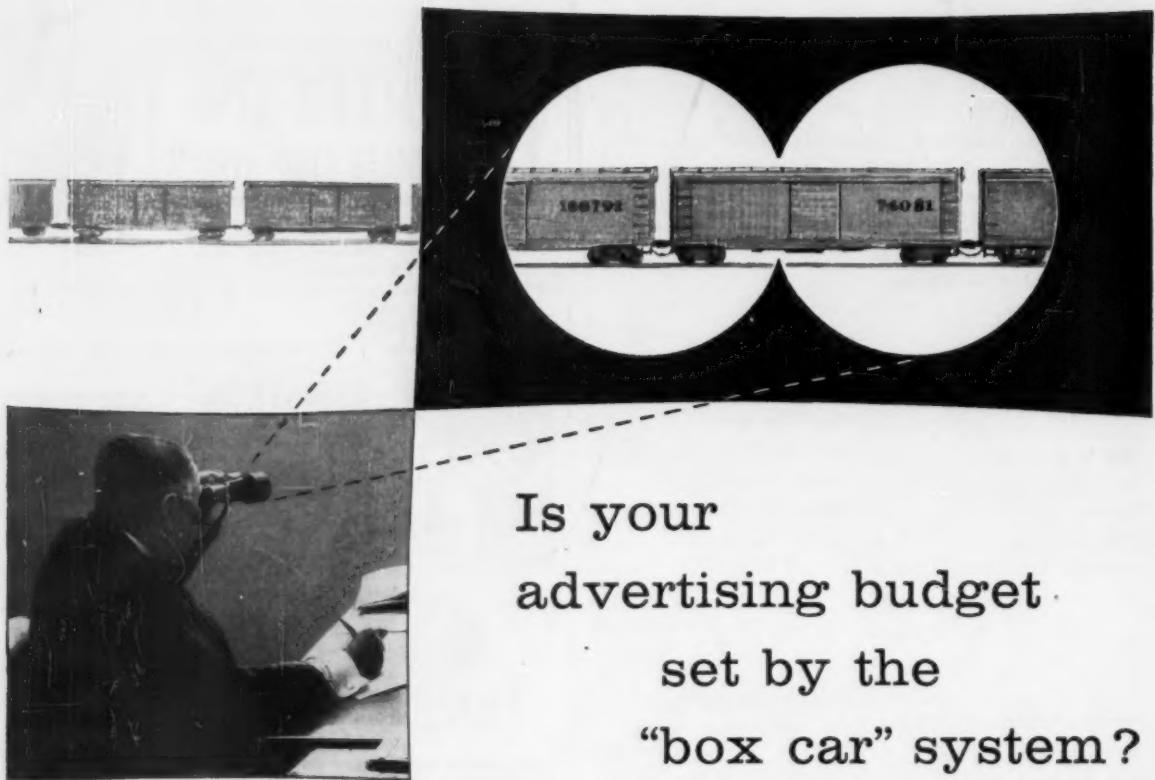
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type

GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.



*Cutting Off  
Machines for  
Sawing All Kinds  
of Metals*

**THE ESPEN-LUCAS MACHINE WORKS**  
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.



## Is your advertising budget set by the “box car” system?

Figures in an advertising budget may be impressively precise and detailed, but still be as unrealistic as if they were picked from passing box cars. Such a budget is good enough only if you haven't decided just what you want to accomplish in selling.

If, however, your company has a specific marketing plan, if you have set your sales objectives product by product and market by market, then you have the foundation for an advertising budget which represents *planned sales effort*, not merely anticipated expenditures.

When your advertising people know exactly what you plan to sell, where you plan to sell it, and how much you plan to sell, they can begin to fit advertising into the marketing program. They can select from the many forms of advertising those which are best fitted for specific tasks, determine how each one should be used and to what extent it should be used.

In short, they can give you an advertising budget which reflects *the sales job you want done*.

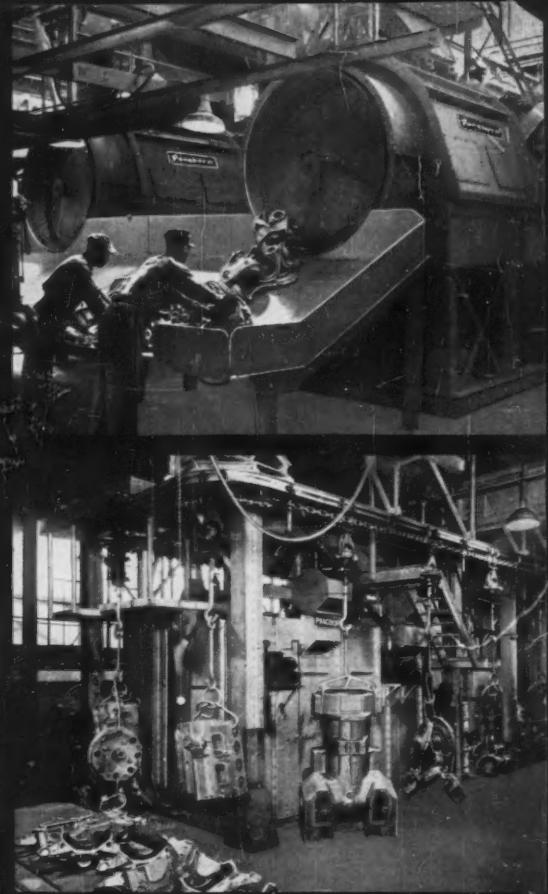
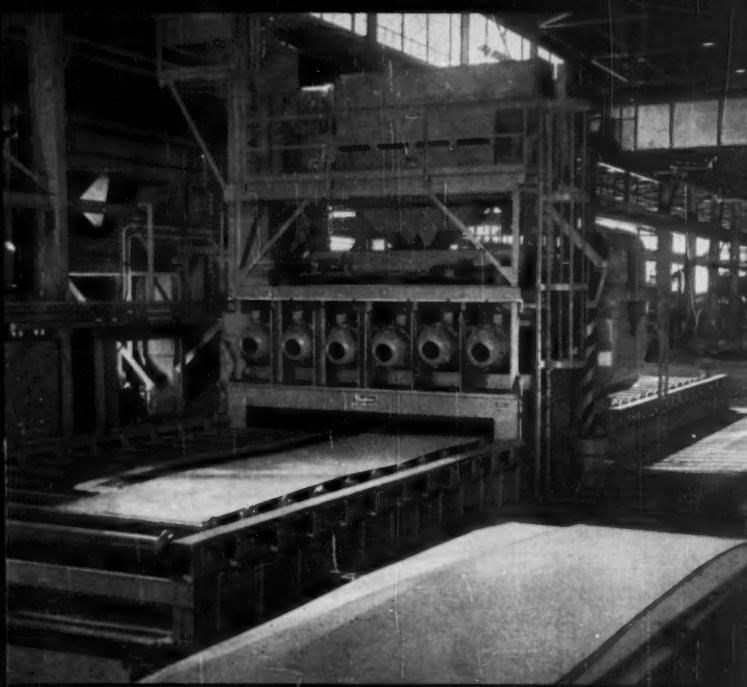
Industrial advertising is an integral part of the marketing process—and you are not getting full value for your advertising dollar unless your advertising men are kept fully informed on your marketing plans.

**National Industrial Advertisers Association, Inc.**  
271 Madison Avenue, New York 16, New York

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.



# If you have



## an unusual blast cleaning problem,



If you are a company with a special cleaning problem, Pangborn offers you a special service—a machine designed for your individual needs. It might be a descaling machine for bars, sheets and coils, a continuous-flow barrel or a monorail cabinet like the machines shown here . . . or it might be completely different. You may need to clean cylinder blocks, bathtubs or any unusual ferrous or nonferrous castings, forgings, stampings. If so, Pangborn engineers will study your problem and its relation to your production line. Then they'll design a Pangborn machine that gives you better cleaning and faster production at lower cost. Pangborn has proved it in hundreds of cases. Pangborn can prove it to you! Write today for Bulletin 1210 to: PANGBORN CORP., 1500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

\*U. S. Pat. # 2184926 (other patents pending)

## Pangborn Rotoblast® can solve it!

# Pangborn

## BLAST CLEANS CHEAPER



Rotoblast Blastmaster®  
& Continuous-Flo Barrel



Rotoblast Tables  
& Table-Rooms



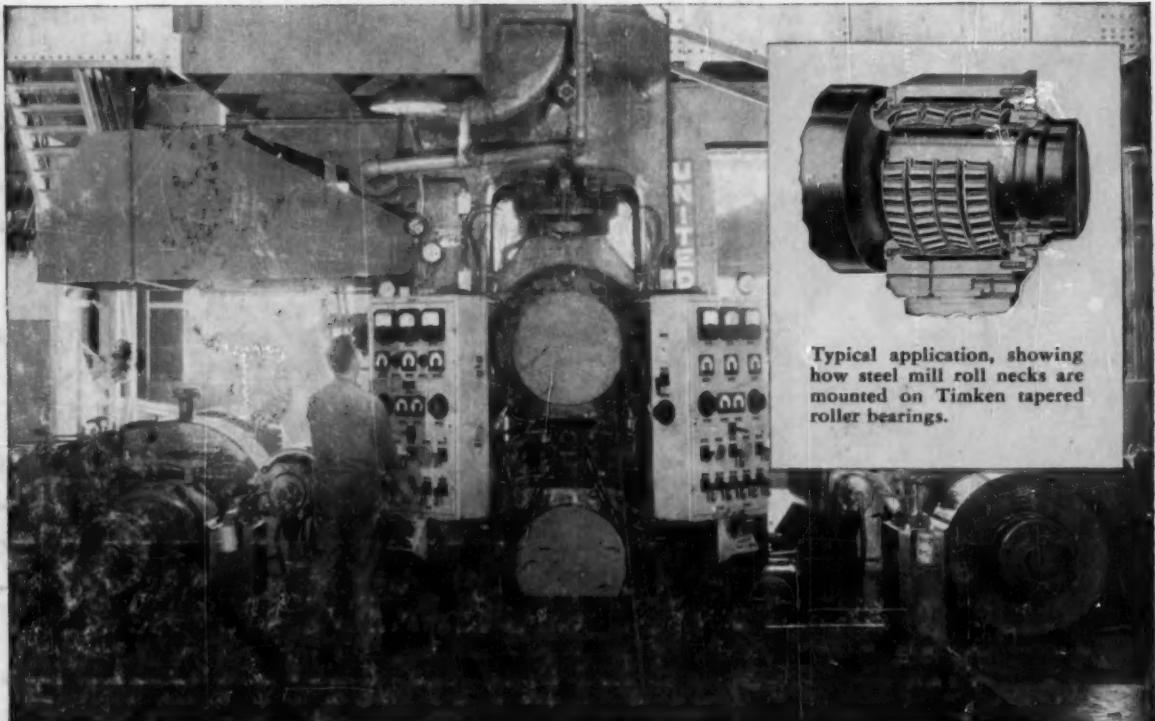
Special Blast Rooms  
& Cabinets



Pangborn Dust  
Control Equipment

*Distributors for Malleabrasive and Tru-Steel Abrasives*

# Scrap loss minimized with reversing cold mill back-up rolls on TIMKEN® bearings



Typical application, showing how steel mill roll necks are mounted on Timken tapered roller bearings.

THE back-up rolls on this United Engineering 6" & 34" x 30" 4-high reversing cold mill at Allegheny Ludlum's Leechburg plant are mounted on Timken® tapered roller bearings. Timken bearings give low torsional resistance, regardless of operating speed or load. This eliminates the need for altering or relieving screw-down pressure — maintains gauge which minimizes scrap loss at each end of the coil. Less hydraulic accumulator pressure is needed with rolls driving easier on Timken bearings, which reduces bearing wear, cuts maintenance cost.

The balanced proportion design of Timken bearings provides maximum capacity in a given space. Timken

tapered roller bearings give you greater mill rigidity, permit large diameter roll necks. They take both radial and thrust loads in any combination, require *no extra thrust devices*—which means more compact chuck mountings, simplified mill design. And by holding mill rolls rigid, Timken bearings help insure "on-gauge" operation, cutting scrap loss and reducing still further the cost per ton of steel rolled.

With Timken bearings, roll and chuck are held concentric, making closures more effective. There's less leakage of lubricant. And with economically grease-lubricated Timken bearings, lubrication requires no tubes, pipes or reservoirs. When you build

or buy machinery, look for the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



*This symbol on a product means its bearings are the best.*



# TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.